ANNUAL REPORT OF THE CENTRAL METEOROLOGICAL OBSERVATORY OF JAPAN

FOR

THE YEAR 1897.

PART II. No. 1.

ON

THE BAROMETRIC DEPRESSIONS

IN

THE YEAR 1897.

PUBLISHED BY THE CENTRAL METEOROLOGICAL OBSERVATORY,

TOKIO.

1906.

The part II. of the Annual report of the Central Meteorological Observatory of Japan for the year 1897 consists of:—

1. *On the barometric depressions in the year 1897.*

2. *On the precipitation in the year 1897.*

3. *On the earthquakes in the year 1897.*

4. *Magnetic observations in the year 1897.*
   Observations on atmospheric electricity in the year 1897.

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CONTENTS.

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INTRODUCTION.

The present report which is to be regarded as the continuation of the "*Memoirs on the areas of low and high pressure and gales*" hitherto published by this observatory, contains the result of investigations on typhoons, cyclones and secondary barometric depressions that passed over this country and the neighbouring seas during the year 1897.

The documents used in preparing this report are the manuscripts of tridaily weather charts of this observatory, and storm records sent from the provincial meteorological stations and naval semaphores. The meteorological logs taken on board the Imperial navies, merchant marines, and foreignv essels are used, in so far as they are available. The Bulletines published by the Zi-ka-wei Meteorological and Magnetic Observatory, Shanghai, China coast Meteorological registers printed by Hongkong Observatory and Meteorological Returns from the Imperial Korean Customs are also consulted.

The report consists of two parts, the first part containing analysis of the barometric depressions in each month, and the second, detailed descriptions of more important storms. In the analysis of the depressions their origins, motions and lowest barometric readings are concisely stated. But in case they were attended by unusual phenomena, such as severe storm, heavy rainfall, strong gales etc., more lengthy descriptions are given. The division of the cyclonic storms into typhoons, continental cyclones, barometric depressions, secondary depressions etc are, to some degrees, arbitrary, since we can not distinguish them in several instances. Hence, too much weight must not be attached to the classification given in the heading of the description of each cyclones. In the description of more important storms, brief statements of their appearence, progressive motions together with the meteorological conditions during their passages are given. Damages in, and loss of, property by stormy winds and inundations attending the atmospheric perturbations are also stated as far as possible.

Tracks of all the barometric depressions described in the text are fully exhibited on the charts in the end of the volume. Tracks of more important centres of depression are given in thick lines. Each of the small circles in the track indicates the position of the centre of depression at the time specified by the figures printed near it.

1. ANALYSIS OF THE BAROMETRIC DEPRESSION.

January.—During this month, 16 barometric depressions passed over the Empire and neighbouring seas. Of these, one was a typhoon, seven were continental cyclones and the remaining eight the depressions. Three of these centres of atmospheric perturbation came from China proper, two from Manchuria, two from Amur province, two from the Eastern sea of China, one from Southern Japan sea, and the remaining six from the Pacific ocean.

I. *Depression of the 3rd—the 4th.*—This barometric depression was first noticed in the Eastern sea of China on the morning of the 3rd. Quickly moving towards the northeast, it traversed Japan sea, and entered the Pacific, crossing Northern Hokkaido and the Southern Kuriles on the 4th. L. B. 752 mm.*

II. *Continental cyclone of the 5th—the 6th.*—This continental depression developed near the Lake Tonting in the Yangtsekiang valley. Rapidly advancing towards the northeast, the cyclone passed near Chinkiang at 10 am on the 5th, and north of Shanghai at 1 p.m. on the same day, and at last entered the Yellow sea. On the night of the 5th, the cyclonic centre passed over Southern Korea, causing a severe storm of wind and rain in the Tsushima straits. After traversing Southern Japan sea and Northeastern Japan, the depression entered the Pacific on the morning of the 6th. L. B. 748 mm.

III. *Depression of the 5th—the 6th.*—This depression was lying in the parallel of 30°N. and the 136th Meridian on the night of the 5th., and passed near the island of Hachijo on the morning of the 6th. L. B. Unknown.

IV. *Depression of the 7th.*—This depression was lying in the parallel of 30°N and the 138th Meridian on the early morning of the 7th. It passed towards the northeast, causing general rainfall over Southeastern Japan.

L. B. Unknown.

V. *Depresssion of the 8th—the 9th.*—This depression appeared in the sea east of the Liukius on the night of the 8th, advanced towards the northeast, and passed south of the island of Hachijo on the night of the 9th, causing rain and snowfall on the Pacific coast. L. B. Unknown.

VI. *Depression of the 9th—the 11th.*—This depression developed in Southern

* L. B stands for the lowest barometer.

Japan sea near the island of Oki on the night of the 9th., and moved towards the northeast. After traversing the extreme north of Honshiu and Southern Hokkaido on the afternoon of the 10th, the centre of depression entered the Pacific, and passed off the East coast of Hokkaido on the early morning of the 11th. L. B. 758 mm.

VII *Depression of the 13th—the 14th.*—This depression appeared in the sea south of the Cape of Shiwomisaki on the night of the 13th, and progressed towards the northeast, passing south of the island of Hachijo on the afternoon of the 14th. L. B. Unknown.

VIII. *Continental cyclone of the 11th—the 15th.*—This continental depression appeared in Southern China, and passed north of Foochow on the 11th, and southwest of Ningpo on the 12th, It was lying off our South Coast on the early morning of the 15th, and it passed near the island of Hachijo on the night of the same day. This depression gradually became deepened, and developed a full cyclonic storm, so that it caused a severe storm in Japan proper. L. B. 745 mm.

IX. *Typhoon of the 17th —the 18th.*— This typhoon appeared in the sea south of the Liukius, and was found in the sea southwest of the Okinawashima islands, making its way towards the northeast on the 17th. The cyclonic centre travelled along our Pacific coast, and passed off the Boso peninsula on the night of the 18th. A rather severe storm was experienced on our Pacific coast during the passage of this typhoon. L. B. 745 mm.

X. *Continental cyclone of the 17th—the 18th.*—This came from Manchuria, and passed to the Pacific, traversing Northern Hokkaido on the 18th.

L. B. 748 mm.

XI. *Continental cyclone of the 21st—the 22nd.*—This depression came from Amur district, and entered the sea of Okhotsk, passing through Soya strait on the night of the 22nd. Moving further towards the southeast, the cyclonic centre crossed the Southern Kuriles, and passed into the Pacific.

L. B. 750 mm.

XII. *Depression of the 21st—the 22nd.*—This appeared in the sea north of the island of Ishigakijima on the early morning of the 21st, and moved towards the northeast, passing near the islands of Okinawajima at 4 p.m. of the same day. It passed south of the Boso peninsula on the morning of the 22nd. Since it travelled off coasts, its track is not definitely known.

L. B. Unknown.

XIII. *Continental cyclone of the 23rd—the 24th.*—This continental cyclone appeared in Southern Sakhalien on the night of the 23rd, and entered the Pacific traversing Southern Kuriles on the afternoon of the 24th. L. B. Unknown.

XIV. *Continental cyclone of the 26th.*—This appeared near the southeast coast of Sakhalien, and moved towards the southeast. L. B. Unknown.

XV. *Depression of the 27th —the 28th.*—This depression appeared in the sea east of the Okinawajima, and moved towards the northeast, passing south of Hachijo island on the morning of the 28th. The track of this depression is not definitely known. L. B. Unknown.

XVI. *Continental depression of the 28th—the 29th.*—This depression developed a midway of Kingan and Foochow in Southern China on the 27th, and entered the Eastern sea of China on the 28th. The depression passed north of the island of Amami-Oshima on the 29th, and entered the Pacific. L. B. 756 mm.

February.—During this month, 11 barometric depressions passed over this country and neighbourring seas. Of these, 5 were continental depressions and the others, areas of low barometer. Most of them were shallow in depth, and caused no serious atmospheric disturbances. Two of these eleven depressions came from Manchuria, three from the sea south of the Liukius, one from Southern Korea, two from Japan sea, one from the Pacific and the remaining two from the Eastern sea of China. In only one instance, the segmentation of a barometric depression occurred, so that there were 12 depressions instead of 11 in all.

I. *Depressions of the 1st—the 2nd.*—On the last day of the preceding month, a barometric depression appeared in the sea south of the islands of Yaeyama, and moved northwards, gradually recurving towards the northeast. Arriving north of the island of Amami-Oshima, the depression broke up into two secondaries. One of them travelled along the Pacific coast, and the other along the coast of Japan sea. The former secondary depression passed south of the Cape of Shiomisaki about midnight of the 1st, and off the south east coast on the morning of the 2nd, while the latter passed northern Kiushiu on the afternoon of the 1st, and north of the Noto Peninsula on the early morning of the 2nd, and near Cape of Soya on the afternoon of the 2nd. These barometric depressions caused stormy weather all over this country, and high winds or gales on the coasts. General rainfall set in on the early morning of the 1st, and continued till the morning of the next day over Japan proper. In Hokkaido, a severe storm occurred on the 2nd. L. B. 740 mm.

II. *Depression of the 3rd—the 4th.*—This depression came from Korea, and appeared in the eastern part of Japan sea on the night of the 3rd. Traversing the northeastern district of Japan proper, it entered the Pacific on the morning of the 4th. L. B. 750 mm.

III. *Continental cyclone of the 4th.*—This cyclone came from Manchuria, and appeared near the west coast of Hokkaido on the afternoon of the 4th. It entered the Pacific traversing Hokkaido on the same day.

L. B. 748 mm.

IV. *Depression of the 8th—the 9th.*—The place where this depression first came into existence was quite unknown. It was lying near the Tsugaru strait on the night of the 8th. Moving towards the northeast, the depression passed near Kushiro in Hokkaido on the early morning of the 9th, and south of the Southern Kuriles on the afternoon of the 9th. L. B. 750 mm.

V. *Depression of the 10th.*—This appeared near the island of Hachijo on the afternoon of the 10th, and passed towards the northeast.

L. B. Unknown.

VI. *Continental depression of the 10th.*—This continental cyclone came from Manchuria, and appeared in Northern Japan sea on the afternoon of the 10th. On the night of the same day, the cyclone entered the Pacific, traversing Southern Hokkaido. L. B. 750 mm.

VII. *Depression of the 15th.*—The place where this depression originated is unknown. Our morning weather chart of the 15th gave a marked evidence of its existence in the Eastern sea of China. It entered the Pacific passing north of the island of Amami-Oshima about noon of the same day.

L. B. Unknown.

VIII. *Depression of the 15th.*—This depression developed in Southern Japan sea on the early morning of the 15th, and moved towards the northeast, gradually increasing in depth and energy. The depression passed the Tsugaru strait on the night of the 15th. L. B. 755 mm.

IX. *Depression of the 19th—the 20th.*—This depression appeared in the Eastern sea of China on the early morning of the 19th, and moved towards the northeast. Passing north of Amami-Oshima on the afternoon of the 19th, the depression entered the Pacific. It passed south of the island of Hachijo on the 20th. L. B. Unknown.

X. *Depression of the 22nd—the 23rd.*—This area of low pressure was first noticed near the island of Liukius on the morning of the 22nd. Moving towards the northeast, it passed off our southeast-coast on the afternoon of the 23rd. The track of this depression is not definitely known. L. B. Unknown.

XI. *Depression of the 25th.*—This depression appeared near the island of Ishigaki-jima on the night of the 24th. Moving towards the northeast, it passed south of the island of Hachijo on the afternoon of the 25th.

L. B. Unknown.

March.—During this month, 15 barometric depressions passed over this country and the neighbouring seas. Of these 15 areas of low barometer, 10 were barometric depressions and 5 were continental cyclones. Three of these low areas came from Eastern sea, five from Southern China, one from Amur Province, two from the sea south of the islands of Liukius, one from Northern China, two from Japan sea, and the remaining one developed in Southern Japan.

I. *Depression of the 1st.*—This depression appeared in the Eastern sea of China on the afternoon of the 1st, and entered the Pacific passing near the island of Amami-Oshima on the same day. L. B. Unknown.

II. *Continental depression of the 1st—the 2nd.*—This came from Amur province, appeared near the west coast of Hokkaido on the night of the 1st, and moved towards the southeast. On the early morning of the 2nd, the depression entered the Pacific, traversing Southwestern Hokkaido. L. B. 760 mm.

III. *Depression of the 3rd—the 4th.*—This depression appeared in Northern Japan sea on the night of the 3rd, and moved towards the northeast, passing Southern Sakhalien on the morning of the 4th, and entered the sea of Okhotsk.

L. B. Unknown.

IV. *Depression of the 3rd—the 5th.*—This area of low barometer appeared in the sea south of the island of Okinawa on the night of the 3rd, and entered the Eastern sea of China Moving towards the northeast, it entered the Pacific, passing near the island of Amami-Oshima on the morning of the 4th, and near the island of Hachijo on the early morning of the 5th.

L. B. Unknown.

V. *Continental depression of the 6th—the 8th.*—This depression was first noticed in Southern Yellow sea on the night of the 6th, moved towards the northeast and entered the sea of Japan, passing over Southern Korea on the afternoon of the 7th. It crossed over our Northeastern district, becoming greatly reduced in depth and energy. L B. 755 mm.

VI. *Depression of the 8th.*—This depression developed off the south coast of Shikoku on the night of the 7th, and moved towards the east, passing near the island of Hachijo on the afternoon of the 8th. L. B. Unknown.

VII. *Continental depression of the 6th—the 10th.*—This area of low barometer was first noticed southeast of Chonking in the Upper valley of Yangtsekiang on the 5th. Moving towards the east, the depression passed south of Hangkow and Kiukiang on the morning of the 6th, and broke up into two secondary depressions near Lake Poyang on the same day. One of them passed north of Shanghai on the evening of the 6th, and entered Southern Yellow

sea. Its subsequent passage and movement are described in No. V. The other passed south of Shanghai about noon of the 8th, causing strong winds or gales on the coast of Southern China. On the early morning of the 9th, it was in the Eastern sea of China, making its way towards the east.

On the morning of the 9th, the cyclonic centre crossed Southern Kiushiu and entered the Pacific. It passed south of the Cape of Shiomisaki on the night of the 9th, and landed on the southeast coast of Japan proper. The depression again entered the Pacific, passing south of Tokio and north of Choshi on the early morning of the 10th. It travelled along our east coast, and passed towards the Southern Kuriles, touching Nemuro on the night of the 10th. L. B. 740 mm.

VIII. *Depression of the 11th.*—This depression was first noticed in the Eastern sea of China on the night of the 11th, and passed towards the east, and entered the Pacific. L. B. Unknown.

IX. *Continental depression of the 14th—the 16th.*—This depression was first noticed west of Singan in the interior of Chinese Empire on the 14th, and rapidly moved towards the East. The cyclonic centre arrived west of Chefoo, and thence it crossed the Yellow sea and Northern Korea. On the early morning of the 16th, it passed south of Wladiostok, moving eastwards. It entered the sea of Okhotsk, traversing Northern Hokkaido on the evening of the 16th. The depression was a shallow and feeble one when it was first noticed, but it became considerably deepened as it travelled eastwards, and caused a severe storm over Hokkaido on the 16th. L. B. 748 mm.

X. *Depression of the 19th - the 20th*—This depression developed near Foochow on the morning of the 18th, and moved towards the northeast, gradually becoming deeper. On the morning of the 19th it was lying north of the Liukius, moved towards the east, passing near the island of Tanegashima on the afternoon of the 19th, and near the island of Hachijo on the early morning of the 20th. L. B. 755 mm.

XI. *Continental depression of the 21st—the 26th.*—This depression was first noticed southwest of Chonking in the Upper Yangtsekiang valley on the 21st. Moving towards the east, the cyclonic centre passed south of Kiukiang on the 22nd, south of Shanghai on the 23rd, and entered the Eastern sea of China on the early morning of the 24th. On the afternoon of the 25th, the depression passed north of the island of Amami-Oshima and entered the Pacific. L. B. 760 mm.

XII. *Depression of the 25th—the 27th.*—This depression was first noticed in the Eastern sea of China on the night of the 25th, and moved towards the north-

east, passing through the strait of Osumi (Van Diemen strait) on the evening of the 26th. It moved along the Pacific coast of the Empire of Japan, passing near the island of Hachijo on the evening of the 27th. L. B 760 mm.

XIII. *Depression of the 27th—the 28th.*—This depression was first noticed a midway of Foochow and Amoy on the early morning of the 27th, moved towards ENE, and passed near the island of Yakushima on the night of the 27th. The depression entered the Pacific, and passed near the island of Hachijo on the 28th. L. B. Unknown.

XIV. *Depression of the 29th—the 30th.*—This depression appeared in the sea south of Southern Liukius on the early morning of the 29th, and entered the Eastern sea of China. This depression traversed Southern Kiushiu on the early morning of the 30th, and moved along our Pacific coast as far as the Cape Enubosaki in Southeastern Japan. L. B. 755 mm.

XV. *Depression of the 30th.*—This depression developed in Southern Japan sea on the early morning of the 30th. It progressed towards the northeast, and entered the sea of Okhotsk, traversing northern Hokkaido on the night of the same day. L. B. 750 mm.

April.—The number of barometric depressions that passed over and near this country was 14, 7 of them being depressions, 5 the continental cyclones and the remaining 2 local secondary depressions. Of these 14 low areas, 3 came from the Eastern sea, 4 from Northern China, 2 from the Yangtse valley, one from the sea south of Liukius, one from Pacific, and one developed in Western Japan, and two in Central Japan.

I. *Depression of the 1st—the 3rd.*—This depression was noticed in the Eastern sea fo China on the early morning of the 1st, and moved towards the northeast and entered the Pacific passing near the island of Yakushima on the night of the 1st. It travelled along our Pacific coast, passing south of the Cape of Shiomisaki on the afternoon of the 2nd, and off the Southeast coast on the early morning of the 3rd, The barometer fell to 746.1 mm at Nagatsuro at 6am on the 3rd, and to 745.8 mm at Choshi meteorological station at 7 am. on the same day. L. B. 744 mm.

II. *Depression of the 1st—the 2nd.*—This depression developed near Nagasaki in Western Japan on the night of the 1st, and entered the sea of Japan, moving towards the northeast. It passed north of the Cape of Noto on the night of the 2nd, and traversed Northeastern Japan on the 4th. L. B. 745 mm.

III. *Secondary depression of the 3rd.*—The secondary depression developed near Kofu in Central Japan on the morning of the 3rd, and moved south-

eastwards, passing near Oshima on the night of the same day. L. B. 750 mm.

IV *Secondary depression of the 4th.*—The secondary depression developed near Kofu in Central Japan on the afternoon of the 4th, and entered the Pacific, moving southeastwards. L. B. 759 mm.

V. *Continental cyclone of the 4th—the 5th.*—This depression was first noticed south of Shangtung promontory on the 4th, and made its way towards the northeast. It crossed the Yellow sea, Northern Korea and the sea of Japan, and thence it passed to the sea of Okhotsk. L. B. Unknown.

VI. *Depression of the 6th—the 7th.*—This depression was noticed in the Eastern sea of China on the early morning of the 6th, and entered the Pacific moving towards the east on the afternoon of the same day. It passed south of the island of Hachijo on the early morning of the 7th. L. B. Unknown.

VII. *Continental depression of the 7th—the 10th.*—This continental depression was first noticed south of Kiukiang in lower Yangtse valley on the 7th. It passed between Chinkiang and Shanghai on the 8th. After entering the Eastern sea of the China, the depression rapidly moved towards the East, and passed near Nagasaki on the night of the 8th. Gradually turning its course, the cyclonic centre entered the sea of Japan, and passed to the Pacific, visiting Hakodate on the morning of the 10th, and passing south of the Cape of Erimosaki on the afternoon of the same day. This continental cyclone became considerably developed as it moved towards this country, and caused a severe storm in Hokkaido. L. B. 735 mm.

VIII. *Depression of the 8th—the 9th.*—This depression appeared in the Eastern sea of China on the afternoon of the 8th, and made its way towards the northeast, passing near Amami-Oshima island on the night of the 8th. It travelled along our Pacific coast, passing near Tokio on the evening of the 9th. Abundant rain fell, and gales prevailed around the centre. The barometer fell to 743.2 mm at Choshi at 6,30 p m. on the 9th. L. B. 743 mm.

IX. *Continental depression of the 14th.*—This depression came from Northern China, and appeared in Northwestern Japan sea on the early morning of the 14th. It entered the Pacific traversing Hokkaido on the night of the 14th. L. B. 760 mm.

X. *Continental depression of the 12th—16th.*—This depression was first noticed near Kiukiang in the Yangtse valley on the 12th, and slowly moved towards the east, arriving near Nagasaki on the morning of the 15th. It traversed the Inland sea district and Central Japan, and entered the Pacific on the early morning of the 16th. A number of secondary centres of depres-

sion were developed within the area of low barometer, as this continental depression was passing through Central Japan. L. B. 755 mm.

XI. *Depression of the 18th—the 20th.*—This depression appeared in the sea south of the island of Okinawa on the night of the 18th. Moving towards the northeast, the low area passed south of the island of Hachijo on the morning of the 20th. L. B. Unknown.

XII. *Continental cyclone of the 21st—the 22nd.*—This continental cyclone appeared in Northern China, and crossed Northern Korea on the morning of the 21st. After traversing Northern Japan sea, the cyclonic centre entered the sea of Okhotsk on the 22nd. The track of this storm lying over the continent is not definitely known. L. B. Unknown.

XIII. *Depression of the 24th—the 25th.*—This depression appeared in the Yellow sea on the 24th, moved southeastwards, and crossed Southern Korea. The low area crossed Central Japan and entered the Pacific. It was lying off our southeast coast on the afternoon of the 25th. L. B. 753 mm.

XIV. *Depression of the 27th.*—This depression appeared in the sea south of the Cape of Shiomisaki on the night of the 27th, and moved towards the northeast, passing south of the island of Hachijo. L. B. Unknown.

May.—During the present month, eighteen barometric depressions, of which eight were continental cyclones; eight, area of low barometer; and the remaining two, secondary depressions, passed over this country and neighbouring seas.

I. *Depression of the 1st—the 4th.*—This depression appeared in the Eastern sea of China on the night of the 1st, and moved towards the northeast, passing near the island of Yakushima on the night of the 2nd. It appeared near the promontory of Shiomisaki on the afternoon of the 3rd, and landed near Hamamatsu about midnight of the 3rd, and entered again the Pacific, traversing southeastern Japan on the 4th. This barometric depression caused a threatening weather and plentiful rainfall on our Pacific coast. L. B. 736 mm.

II. *Depression of the 4th—the 5th.*—This depression was first noticed in Northern Japan sea on the afternoon of the 4th, and moved towards the northeast, traversing Southern Sakhalien on the afternoon of the 5th. The track of this storm is not definitely known. L. B. Unknown.

III. *Continental cyclone of the 7th—the 8th.*—This depression appeared in the Yangtsekiang valley on the 6th, and moved towards the northwest. It traversed Japan proper, passing our Northern Kiushiu on the morning of the 7th, and over the southeast coast on the morning of the 8th. L. B. 748 mm.

IV. *Depression of the 7th.*—This depression developed in the Bay of Wakasa on

the afternoon of the 7th. Moving towards the northeast, the low area entered the Pacific, traversing the strait of Tsugaru on the night of the 7th.
L. B. 740 mm.

V. *Continental depression of the 10th—the 11th.*—This depression came from Southern China on the afternoon of the 10th, and passed to the Pacific traversing Southern Kiushiu on the 11th. L. B. 755 mm.

VI. *Secondary depression of the 11th.*—This depression appeared off Western Kiushiu on the early morning of the 11th, and passed towards the sea of Japan, traversing Northern Kiushiu on the same day. The depression was filled up in Southern Japan sea L. B. 754 mm.

VII. *Continental depression of the 14th—the 15th.*—This depression appeared in Central China, and passed north of Shanghai about midnight of the 14th. After entering the Yellow sea, the low area became greatly increased in depth and energy. It traversed Southern Korea on the afternoon of the 15th, crossed Japan sea, and finally passed to the sea of Okhotsk on the 16th. A severe storm occurred on coast of Japan sea and in Southern Korea on the 15th, during the passage of this depression. L. B. 748 mm.

VIII. *Depression of the 15th—the 16th.*—This depression appeared in Southern Japan sea on the morning of the 15th, and moved towards the northeast. Traversing Northeastern districts of Japan proper on the night of the 15th, the cyclonic centre entered the Pacific. On the early morning of the 16th, it passed south of Nemuro, Hokkaido. L. B. 748 mm.

IX. *Depression of the 17th—the 19th.*—This area of low barometer appeared off Southwestern Kiushiu on the night of the 17th, and moved northeastwards along the coast of Japan sea, passing north of Noto peninsula on the morning of the 19th. It passed into the Pacific, traversing Northeastern Japan on the same day. The track of this depression, however, is not definitely known. L. B. 751 mm

X. *Depression of the 18th—the 20th.*—This depression appeared in the Eastern sea of China on the early morning of the 18th, and moved towards the east along our Pacific coast, passing near the island of Hachijo on the early morning of the 20th. L. B. Unknown.

XI. *Continental depression of the 20th.*—This depression came from Northern Manchuria, and traversed Hokkaido on the 20th. It entered the Pacific on the same day. L. B. 745 mm.

XII. *Depression of the 20th.*—This depression appeared in the sea north of Noto

peninsula on the 20th, moved towards northeast, and finally passed to the Pacific on the 21st. L. B. 750 mm.

XIII. *Continental cyclone of the 20th—the 21st.*—This cyclone appeared near Wladiostok on the morning of the 20th, and passed to the Okhotsk, traversing Northern Japan sea and Northern Hokkaido on the 21st. The track of this depression is not definitely known. L. B. 748 mm.

XIV. *Secondary depression of the 21st.*—This depression developed in Central Japan on the afternoon of the 21st, and entered the Pacific, moving towards the southeast. L. B. 748 mm.

XV. *Continental depression of the 23rd.*—This depression came from Southern China, and appeared in the Eastern sea of China on the afternoon of the 23rd. It travelled along our Pacific coast, passing near the island of Hachijo on the 24th. L. B. 750 mm.

XVI. *Continental depression of the 24th.*—This depression came from Northern Korea on the 24th, moved towards the northeast, and disappeared in Northern Japan sea. The track of this depression is not definitely known. L. B. Unknown.

XVII. *Depression of the 27th—the 28th*—This depression appeared in the Gulf of Korea on the afternoon of the 27th, moved towards the northeast and passed towards the Soya strait on the night of the 28th. L. B. Unknown.

XVIII. *Continental depression of the 28th—the 29th.*—This depression came from Southern China, and appeared in the Eastern sea of China on the night of the 28th. It entered the Japan sea through the straits of Tsushima about the noon of the 29th, and passed over Japan sea and Southern Sakhalien. L. B. 745 mm.

June—During the present month, fifteen barometric depressions, of which one was a continental cyclone; eleven were areas of low barometer; and three, secondary depressions, passed over this country and neighbouring seas.

I. *Continental depression of the 2nd—the 3rd.*—This depression appeared near the Shangtung promontory on the 2nd, moved towards the east, and passed over Central Korea on the night of the 2nd. The depression entered the Japan sea, and disappeared north of the island of Sado on the night of the 3rd. L. B. Unknown.

II. *Depression of the 2nd.*—This depression appeared near the coast of Southern China on the morning of the 2nd, and moved towards ENE, and traversed the Eastern sea of China. It entered the Pacific, and moved southeastwards. L. B. Unknown.

III. *Depression of the 4th—the 7th.*—This depression appeared north of Formosa on the early morning of the 4th, moved northeast, and entered Japan sea, passing through the straits of Tsushima on the night of the 4th. This depression remained almost stationary in the sea north of the island of Sado from the 6th to the 7th, and finally filled up there. L. B. 745 mm,

IV. *Depression of the 5th—the 6th.*—This depression developed in Southeastern Kiushiu on the early morning of the 5th, moved towards Southeast, and passed to the Pacific on the 6th. L. B. 748 mm.

V. *Secondary depression of the 6th,*—This depression developed in Central Japan on the afternoon of the 6th, moved southeastwards; and entered the Pacific. L. B. 747 mm.

VI. *Depression of the 10th—the 15th.*—This depression appeared in the sea south east of Formosa on the night of the 10th, moved northeastwards, and entered the Eastern sea of China. Slowly recurving towards the east, the depression passed through the Van Diemen strait, and entered the Pacific, It passed near the island of Hachijo on the early morning of the 15th. The track of this depression is not definitely known. L. B. Unknown.

VII. *Depression of the 12th—the 15th.*—This depression appeared in Southern Japan sea on the night of the 12th, moved in the northeasterly direction, and entered the sea of Okhotsk, traversing Hokkaido on the 15th. L. B. 752 mm.

VIII. *Depression of the 15th—the 16th.*—This depression appeared in the Pacific, south of the Cape of Shiomisaki on the afternoon of the 15th, and moved northeastwards, passing near the island of Hachijo on the early morning of the 16th. L. B. Unknown.

IX. *Depression of the 16th—the 17th.*—This developed in the eastern inland sea district on the afternoon of the 16th, moved towards the southeast and entered the Pacific on the early morning of the 17th. This secondary depression caused thunder-storms and heavy rainfall along its track. L. B. 750 mm.

X. *Secondary depression of the 16th,*—This depression developed in the plateau in Central Japan on the afternoon of the 16th, moved towards the northeast, and entered the sea of Japan on the night of the 16th. This secondary depression filled up near the island of Sado. L. B. 750 mm.

XI. *Depression of the 17th—the 19th.*—This depression appeared near Southeastern Formosa on the early morning of the 17th, moved northeastwards, gradually recurving towards the east, and entered the Pacific, passing north of

Amami-Oshima on the early morning of the 19th. L. B. 750 mm.

XII. *Depression of the 19th—the 20th.*—This depression came from Northern Korea, and appeared in Central Japan sea on the afternoon of the 19th. It entered the sea of Okhotsk on the 20th. The track of this cyclone is not definitely known. L. B, Unknown.

XIII. *Depression of the 20th—the 21st.*—This depression appeared near the island of Ishigakijima on the night of the 20th, moved northeastwards, gradually curving towards the east. It entered the Pacific, passing north of the islands of Okinawajima on the night of the 21st, L. B. 745 mm.

XIV. *Secondary depression of the 22nd.*—This depression developed near Kofu in Central Japan on the afternoon of the 22nd, and entered the Pacific, moving southeastwards. L. B. 748 mm.

XV. *Depression of the 25th—the 30th.*—This barometric depression appeared in the sea south of the island of Ishigakijima on the early morning of the 25th, moved northeastwards, and entered the Eastern sea of China, passing near the island of Ishigakijima on the afternoon of the same day. It remained almost stationary in the sea from the 26th to the 27th. This retardation in its progressive motion was probably caused by the influence of another barometric depression which followed the present cyclone. On the night of the 28th, the depression was lying southeast of the island of Okinawajima. On the early morning of the 29th, it drew near the island of Amami-Oshima, causing a decided fall of the barometer in the island. The minimum barometric height of 747.4 mm. was observed at 7 a.m. on the same day. We give below an extract of the meteorological observation at the Oshima meteorological station during the passage of the depression :—

Date.	Hour.	Barometer.	Wind-direct.	Wind-velocity.	Rainfall.	Weather.
28th	11p.	749.5 mm	SE	7.0 m/s	1.0 mm	rain
,,	mn.	49.0	SE	6.5	1.0	,,
29th	1a	48.3	SE	6.9	1.5	,,
,,	2a	48.4	W	4.3	18.8	heavy rain
,,	3a	48.0	W	1.9	17.1	,,
,,	4a	48.0	W	1.9	0.2	rain.
,,	5a	47.7	W	1.3	0.1	cloudy.
,,	6a	47.6	W	1.2	—	,,
,,	7a	47.4	W	1.5	—	,,
,,	8a	47.5	W	1.1	—	clear.
,,	9a	48.0	W	2.7	—	cloudy.
,,	10a	47.9	W	2.7	—	fair.
,,	11a	49.3	W	8.3	0.0	rain
,,	Noon.	48.4	W	11.5	1.2	cloudy.

Passing near the island of Amami-Oshima, this barometric depression entered the Pacific, and moved towards the northeast. As the consequence of its visitations, a general rainfall occurred in Japan proper on the 30th.

July.—During the present month, fourteen barometric depressions passed over the Empire and neighbouring seas. Of these, two were typhoons ; five were continental depressions ; and seven, areas of low barometer. The two typhoons came from the sea south of Liukius and Formosa, and entered the continent. Two of the continental depressions came from Manchuria, two from Northern China and the remaining one from the Yangtse Valley.

I. *Depression of the 1st—the 2nd.*—This depression appeared in the sea south of the island of Okinawajima on the early morning of the 1st, and moved northeastwards, passing near the island of Hachijo on the night of the second. This barometric depression caused a general rainfall and high wind on our southeast coast. L. B. Unknown.

II. *Depression of the 2nd—the 3rd.*—This depression developed in Central Japan sea on the afternoon of the 2nd, moved northeastwards, and entered the sea of Okhotsk, traversing Northern Hokkaido on the 3rd. L. B. Unknown.

III. *Typhoon of June 30th—July 7th.*—This typhoon which was first noticed in the sea east of the Philipines passed north of Luzon about noon of June 30th. It entered the continent, crossing Formosa channel and landing near Swatow. It passed west of Shanghai on the 6th, over Shangtung on the 7th, and Northern Korea on the same day. Owing to the sparseness of meteorological data in the continent during the passage of the storm, its track is not definitely known. L. B. Unknown.

IV. *Depression of the 7th.*—This depression developed near the west coast of Japan on the early morning of the 7th, moved towards the east and entered the Pacific, traversing Japan proper on the same day. General rainfall occurred in Central and Eastern Japan during the passage of the low area.
L. B. 758 mm.

V. *Continental depression of the 8th—the 9th.*—This depression came from Central Korea, appeared in Southern Japan sea on the afternoon of the 8th, and moved towards the east. Gradually changing its course towards the northeast, the depression passed near Akita on the morning of the 9th, and traversed Eastern Hokkaido on the 9th. L. B. 754 mm.

VI. *Continental depression of the 11th—the 12th.*—This depression came from Southern Manchuria, appeared near Wladiostok on the night of the 11th, and entered the sea of Okhotsk, traversing Northern Japan sea on the 12th.
L. B. Unknown.

VII. *Continental depression of the 13th.*—This depression came from Northern China, appeared in Northern Korea on the morning of the 13th, and moved towards the northeast. The depression passed into the sea of Okohtsk on the same day. L. B. 748 mm.

VIII. *Depression of the 15th.*—This depression developed near the west coast of Japan proper on the morning of the 15th, moved towards the northeast, and passed to the Gulf of Tartar. L. B. 750 mm.

IX. *Depression of the 15th—the 16th.*—This depression appeared off our south coast on the night of the 15th and passed towards the east on the 16th, causing a heavy rainfall in Southern Japan. On the night of the 15th, a torrential downpour of rain occurred in Ki-i peninsula. L. B. Unknown.

X. *Depression of the 16th—the 18th.*—This depression came from the Eastern sea, appeared near the west coast of Japan on the night of the 16th, moved towards the northeast, and passed into the Gulf of Tartar on the 18th. L. B. 748 mm.

XI. *Continental depression of the 19th—the 20th.*—This continental depression came from the lower Yangtse-kiang valley, appeared in Southern Yellow sea on the 19th, and quickly passed over Southern Korea and Japan sea. The track of this continental depression is not certain, owing to the sparseness of data. L. B. Unknown.

XII. *Depression of the 20th.*—This depression appeared in the Eastern sea of China on the early morning of the 20th, rapidly moved towards the northeast, and entered the Japan sea, passing through the straits of Tsushima on the night of the 20th. This depression caused a general rainfall of considerable amount in Western Japan. L. B. 753 mm.

XIII. *Continental Depression of the 23rd—the 24th.*—This depression appeared in Northern Japan sea on the afternoon of the 23rd, moved towards the northeast, and traversed Hokkaido on the 24th. L. B. 754 mm.

XIV. *Typhoon of the 28th—the 31st.*—This typhoon was first noticed in the sea east of the Philippines. Moving towards NNW the typhoon appeared near the island of Ishigakijima on the 28th. Itent ered the Eastern sea of China, passing between the Miyakoshima and the Okinawa islands on the night of the same day. It was lying near Shangtung on the 31st where it recurved towards NNE. Owing to the sparseness of meteorological data in the continent, we could not trace the storm-centre beyond Shangtung, but it was supposed that the centre entered Manchuria, touching Port Authur. A

wind and rain occurred along the track of cyclone during the visitation of the typhoon. L. B. 745 mm.

August.—During the present month, eleven barometric depressions passed over this country and neighbouring seas. Of these depressions, two were typhoons, two continental depressions, three low areas and the remaining four secondary depressions. The two typhoons came from the sea south of the Liukiu, and entered the continent. The both continental cyclones came from Manchuria and southern Siberia, the secondary depressions developed in central Japan and passed toward the south, while the remaining one developed in Northeastern Japan, and moved northeastwards.

I. *Continental cyclone of the 2nd.*—This cyclone came from Manchuria, appeared near Wladiostok on the night of the 2nd, and entered the sea of Okhotsk, traversing Northern Hokkaido. This depression caused southerly gales on the coast of Hokkaido. L. B. Unknown.

II. *Depression of the 3rd.*—This depression came from Southern Japan sea, appeared near the Northwest coast of Japan on the early morning of the 3rd, and entered the Pacific, traversing Northeastern Japan. A rather severe storm occurred in Northeastern Japan during the passage of the depression. L. B. 754 mm.

III. *Secondary depression of the 4th.*—This secondary depression developed near Yamagata, a town in Northeastern Japan on the early morning of the 4th, and entered the Pacific, following the former depression. L. B. 754 mm.

IV. *Secondary depression of the 4th.*—This depression developed near Kofu in Central Japan on the afternoon of the 4th, and entered the Pacific, moving towards the southeast. L. B. 743 mm.

V. *Typhoon of the 8th—the 12th.*—This typhoon appeared in the sea southeast of the islands of Miyakoshima, southern Liukius on the afternoon of the 8th, and entered the Eastern sea of China, passing near the islands on the night of the same day. It landed north of Foochow, south China, and moved up to the lower Yangtsekiang valley where it changed its course towards the northeast. The typhoon appeared near the promontory of Shangtung on the morning of the 12th, and passed further northeastwards, touching Wladiostok on the night of the same day. A severe storm occurred in the southern Liukius during the passage of the typhoon. L. B. 735 mm.

VI. *Depression of the 4th.*—This depression appeared near Nemuro, Hokkaido on the early morning of the 14th, and passed towards the southeast. L. B. Unknown.

VII. *Continental depression of the 18th.*—This depression came from Siberia, ap-

peared near Southwestern coast of the island of Sakhalien, and entered the sea of Okhotsk. L. B. Unknown.

VIII. *Depression of the 20th.*—This appeared north of the peninsula of Noto on the early morning of the 20th, and entered the Pacific, traversing Northeastern Japan. L. B. 754 mm.

IX. *Secondary depression of the 21st.*—This depression developed near Kofu in Central Japan on the afternoon of the 21st, and entered the Pacific, moving towards the southeast. L. B. 755 mm.

X. *Secondary depression of the 22nd.*—This secondary depression developed in the same locality as the former depression, on the afternoon of the 22nd, and entered the Pacific, moving towards the southwest. L. B. 754 mm.

XI. *Typhoon of the 20th—the 25th.*—This typhoon appeared near the east coast of Formosa on the night of the 20th, moved northwestwards, and entered the continent, traversing Northern Formosa on the morning of the 21st. Owing to the lack of meteorological date in the continent, a portion of the track of the typhoon lying over the continent was wholly known to us, but it seems probable, that the cyclonic centre recurved its course in the lower Yangtse valley. The typhoon again appeared near the promontory of Shangtung on the early morning of the 24th, after three days' journey over Eastern China, and movod further towards the northeast, crossing Northern Korea and Northern Japan Sea. On the afternoon of the 25th, the typhoon centre was lying near thei slands of Rijiri near North Western Hokkaido. It entered the Okhotsk on the night of the same day. L B. 748 mm.

September.—Nine barometric depressions, of which two were continental depressions, two typhoons and the remaining five areas of low pressure, passed over this country and neighbouring seas during the present month. The two typhoons were of very dangerous character, and caused a great deal of damages on the building, plantations ètc in several prefectures. A detailed descriptions of one of the typhoons is given in the chapter II. of the present report.

I. *Continental depression of the 31st August—1st September.*—This depressio- appeared near Wladiostok on the afternoon of the 31st August, moved ton wards the northeast, and entered the sea of Okhotsk, passing through the Soya strait on the 1st. L. B. Unknown.

II. *Continental depression of the 2nd—the 3rd.*—This depression appeared in the Yangtsekiang valley, moved towards the east, and entered the Eastern sea of China on the evening of the 2nd. The continental depression passed through the straits of Tsushima on the early morning of the 3rd, entered the sea of

Japan and travelled along the coast of the Empire. It entered the Pacific, traversing Northeastern Japan. L. B. 755 mm.

III. *Typhoon of the 6th—the 9th.*—This severe typhoon appeared near the Marianne groups on the 6th, and arrived east of the Okinawajima on the night of the 7th, moving northwestward. Gradually recurving towards the northeast, the typhoon centre appeared in the sea south of Cape Murotosaki southern Japan on the night of the 8th, and at last landed near the cape of Shiomisaki. It passed near the town of Hamamatsu at 3am. on the 9th, and north of Tokio on the early morning of the same day. Again, the centre of storm entered the pacific, and travelled northeastwards up to the Southern Kuriles, and entered the sea of Okhotsk. During the visitation of this terrible typhoon, severe storm of wind and rain occurred, and buildings, plantations etc were greatly damaged by inundation and high wind. L. B. 722 mm.

IV. *Depression of the 7th.*—This depression developed near the island of Sado on the afternoon of the 7th, moved towards the northeast and filled up near the northwest coast of Japan. This small depression attended electrical displays near its centre. L. B. 754 mm

V. *Depression of the 17ht.*—This depression appeared in Northern Japan sea on the early of the 17th, moved towards the Southern, and entered the Pacific, traversing Southern Hokkaido, L. B. 756 mm.

VI. *Depression of the 20th—the 21st.*—This barometric depression appeared in the sea south of the island of Ishigakijima on the morning of the 20th, and rapidly moved up to Northern Kiushiu, where it changed its course towards the east. Passing through the Inland sea district, the depression passed into the Pacific on the 21st, and caused a storm of wind and rain on the south east coast of Japan proper. L. B. 753 mm.

VII. *Depression of the 22nd—the 24th.*—This developed near the east coast of Formosa on the 22nd, moved towards northern Kiushiu by almost the same course with that of preceding depression. Passing along the west coast of Japan proper, the cyclonic centre landed this country on the morning of the 24th, and travelled over Central Japan. It entered the Pacific on the night of the 24th. L. B. 753 mm.

VIII. *Typhoon of the 28th—the 29th.*—This typhoon appeared in the sea south of the Liukius on the early morning of the 28th, and entered the Eastern sea of China, passing between the Okinawa and Miyakojima islands. Recurving towards the northeast, the typhoon-centre approached the west coast of Kiushiu on the afternoon of the 29th, and at last landed near Kumamoto.

The typhoon travelled rapidly over the Pacific coast up to the Bosô peninsula where it passed away into the Pacific. Severe storms occurred in several prefectures during the visitation of the typhoon, and a great deal of damages were done by the high wind and inundation accompanied the cyclonic storm. L. B. 737 mm.

IX. *Depression of the 30th.*—This depression appeared off the west coast of Hokkaido on the early morning of the 30th, and entered the sea of Okhotsk, traversing Northern Hokkaido and causing stormy weather there. L. B. Unknown.

October.—During the present month ten barometric depressions passed over this country and neighbouring seas, of which five were continental depressions, four, areas of low pressure; and the remaining one was a typhoon Four of these continental cyclones came from Manchuria and southern Siberia, and the remaining one from the Yangtse valley. The typhoon came from the Pacific, near islands of Mariana, and travelled off our Pacific coast.

I. *Depression of the 4th—the 6th.*—This depression appeared in the southern sea of Formosa on the afternoon of the 4th, moved northeastwards, and entered the Eastern sea of China. Gradually curving its course towards the east, the depression passed near Noto on the morning of the 6th and entered the Pacific. L. B. 755 mm.

II. *Depression of the 5th.*—This depression came from the Pacific, appeared south of the cape of Shiomisaki on the early morning of the 5th, and passed towards the east, causing a storm of wind and rain, in Southeastern Japan. L. B. Unknown.

III. *Depression of the 7th.*—This depression appeared in the sea east of the Liukius on the 7th, and moved toward the northeast. This depression was found lying off the cape of Shiomisaki on the early morning of the 8th, and it travelled up to the east coast of Japan proper.

IV. *Continental depression of the 7th.*—This depression came from Northern China, appeared off the northeast coast of Korea peninsula or the night of the 7th, and passed to the sea of Okhotsk, moving towards the northeast. Southerly strong gales were felt in Hokkaido, during the passage of this cyclone. L. B. 745 mm.

V. *Continental depression of the 9th—the 12th.*—This depression was first noticed west of Chunking in the upper Yangtsekiang valley in Southern China on the 9th. Making its way towards the east, it passed south of Kiukiang on the 10th, and north of Shanghai about the noon of the 11th. On the early

morning of the 12th, the continental depression was found lying near the southwest coast of Korea, and after traversing central Korea, the depression entered the sea of Japan, and finally passed into the Okhotsk. Southerly gale prevailed in Northern Japan during the passage of this depression.

L. B. 745 mm.

VI. *Continental depression of the 14th.*—This depression came from southern Siberia and entered the sea of Okhotsk, traversing the strait of Soya on the early morning of the 14th. L. B. Unknown.

VII. *Continental depression of the 16th.*—This depression came from Northern Korea, appeared in northern Japan sea on the morning of the 16th, and passed into the sea of Okhotsk. L. B. Unknown.

VIII. *Typhoon of the 23rd—the 25th.*—This typhoon which probably developed near the islands of Marianne approached to the sea east of the Philippines, and changed its northwesterly course towards the northeast. The typhoon appeared in the east of the Liukius on the morning of the 23rd, and off the east coast of Japan proper on the afternoon of the 24th. Moving further northeastwards, the storm-centre passed towards the Kuriles on the morning of the 25th. Since the centre passed off the coast, the whole country with an exception of eastern Hokkaido was luckily free from the damage done by the storms. L. B. 742 mm.

IX. *Depression of the 23rd—the 25th.*—This depression developed in the Tsushima straits on the afternoon of the 23rd, and moved towards the northeast. It appeared near Suttsu on the early morning of the 20th, and traversed Southern Hokkaido on the 25th. This depression developed in depth and intensity as it moved towards the east, so that a severe storm occurred in Hokkaido on the 25th. L. B. 740 mm.

X. *Continental depression of the 28th.*—This depression came from southern Manchuria, appeared in Northern sea of Japan on the early morning of the 28th, and entered the sea of Okhotsk, traversing Northern Hokkaido.

L. B. 750 mm.

November.—During the present month, eleven depressions passed over the Empire and neighbouring seas, of which five were continental cyclones, five, areas of low barometer, and remaining one was secondary depression. The area of low pressure marked No. VII in the text and plate is probably a continental cyclone came from Northern China, but since we have not meteorological date to decide the point, we put it in the class of depression.

I. *Continental depression of the 2nd.*—This depression appeared in the sea of

Okhotsk on the early morning of the 2nd, moved towards the southeast and entered the Pacific, traversing the island of Kunashiri. L. B. Unknown.

II. *Depression of the 3rd—the 5th.*—This depression came from the sea south of the Liukius, and approached the island of Ishigakijima on the night of the 3rd. The typhoon passed between the Okinawajima and Amami-Oshima on the early morning of the 5th. L. B. 722 mm.

III. *Continental depression of the 9th.*—The depression came from Siberia, appeared in the Gulf of Tartar on the early morning of the 9th, and entered the sea of Okhotsk, passing through the strait of Soya. L. B. Unknown.

IV. *Continental depression of the 14th.*—This depression appeared in the Gulf of Tartar on the early morning of the 14th, and entered the Pacific, traversing southern Okhotsk. L. B. Unknown.

V. *Depression of the 15th.*—This depression appeared in the sea southwest of the island of Ishigakijima on the early morning of the 15th, moved towards the northeast, and entered the continent, traversing central Formosa.
L. B. 758 mm.

VI. *Continental depression of the 15th—the 17th.*—This depression developed in the valley of the Yangtsekiang on the 15th, moved towards the east, and entered the Eastern sea of China. The depression appeared near Quelpart island on the early morning of the 16th, and crossed central Kiushiu on the afternoon of the same day. It travelled along our Pacific coast, and passed off the southeast coast of Japan proper on the morning of the 17th.
L. B. 748 mm.

VII. *Depression of the 17th—the 18th.*—This depression appeared in Northern Japan Sea on the afternoon of the 17th, and entered the Pacific, passing through the strait of Tsugaru on the early morning of the 18th. L. B. 750 mm.

VIII. *Depression of the 18th.*—This depression appeared near Southern Formosa on the early morning of the 18th, moved towards the northeast, and entered the Eastern sea of China. After passing near the islands of Yaeyama, Liukius the depression passed to the Pacific. L. B. 757 mm.

IX. *Depression of the 23rd—the 25th.*—This depression appeared near the islands of Tsushima on the early morning of the 23rd, moved towards the northeast and entered the Pacific, passing near the strait of Tsugaru on the early morning of the 25th. The locality where this depression developed is not known, but it is highly probable that it came from the Eastern sea of China. A severe storm of wind and rain was felt in Northeastern Japan.
L. B. 750 mm.

X. *Secondary depression of the 23rd.*—This depression is probably a secondary low area developed in the cyclonic area of the former depression. Our morning weather chart of the 23rd gave a marked evidence of its existence in southern Kiushiu. The depression travelled along our Pacific coast, and passed off the east coast on the 24th. L. B. Unknown.

XI. *Continental de pression of the 27th—the 28th.*—This depression came from northern China, appeared in the Gulf of Korea on the afternoon of the 27th, moved towards the east and traversed the sea of Japan. The depression approached our northwest coast on the morning of the 28th, traversed Northeastern Japan and entered the Pacific. L. B. 749 mm.

December.—Ten barometric depressions passed over this country and neighbouring seas, of which two were continental depressions, 6 secondary depressions and the remaing two areas of low barometer. The two continental cyclones came from eastern Siberia, and entered the Pacific, moving, as a rule, towards the Southeast. One of the two areas of low barometer came from southern Liukiu and the other from the straits of Tsushima. All the secondary depressions developed in central Japan, and most of them passed southeastwards into the Pacific.

I. *Depression of the 6th—the 7th.*—This depression developed near the islands of Tsushima on the early morning of the 6th, moved northeastwards and entered the Pacific, traversing northeastern Japan on the morning of the 7th. The place where this low area developed is not exactly known, but we have the reason to suppose that it originated in the straits of Tsushima, since we could not trace it further westwards beyond that place. L. B. 762 mm.

II. *Continental depression of the 9th—the 10th.*—This depression appeared in the of Tartar on the afternoon of the 9th, moved, as a rule, towards the south-Gulf east, and entered the Pacific, traversing the island of Kunashiri on the early morning of the 10th. A severe snow storm occurred in Hokkaido during the passage of the cyclone. L. B. 745 mm.

III *Depression of the 9th—the 10th.*—This low area appeared near the island of Ishigakijima on the early morning of the 9th, moved towards the northeast, and entered the Pacific, passing near the island of Oshima on the afternoon of the 10th. L. B. 759 mm.

IV. *Secondary depression of the 10th.*—This low area developed near Kofu in central Japan on the afternoon of the 10th, and entered the Pacific, moving towards southeastwards. Cyclonic winds of great intensity developed around the centre of the depression. L. B. 753 mm.

V. *Secondary depression of the 14th.*—This depression developed near Kofu in central Japan on the afternoon of the 14th, and entered the Pacific, moving southeastwards. L. B. 754 mm.

VI. *Secondary depression of the 15th.*—This depression developed near Kofu in central Japan on the ofternoon of the 18th, and entered the Pacific, moving northeastwards. L. B. 757 mm.

VII. *Secondary depression of the 16th.*—This depression developed in the northern side of Mount Fujiyama on the afternoon of the 16th, moved towards the southeast, and entered the Pacific. L. B. 759 mm.

VIII. *Secondary depression of the 20th.*—This depression developed near Iida in central plateau of the Empire on the afternoon of the 20th, moved towards the east, and entered the Pacific. L. B. 758 mm.

IX. *Continental depression of the 26th.*—This depression came from the Gulf of Tartar, appeared in the sea of Okhotsk on the early morning of the 26th, and entered the Pacific, traversing the island of Kunashiri on the afternoon of the same day. L. B. Unknown.

X. *Secondary depression of the 28th.*—This depression developed in the plateau of central Japan on the afternoon of the 28th, moved southeastwards and entered the Pacific. L. B. 758 mm.

II. REMARKABLE TYPHOONS.

1. The typhoon of July 27th—the 30th.

On the early morning of the 27th, the barometer began to fall rapidly in the Liukius and Formosa, and easterly wind set in over the Southwestern islands, while the barometer rose elsewhere. Our weather chart of the afternoon on the same day gave the first marked indication of the existence of a typhoon advancing towards the Liukius. The barometer continued falling in the islands of Ishigakijima and Okinawajima, the fall during the previous 24 hours ending at 2 p.m. on the 27th being 3.4 mm, at the former and 1.7 mm at the latter. Cyclonic wind was fully developed over the islands. The Ishigakijima felt northeasterly strong wind and the Nafa easterly wind of moderate force. The area of high barometer was occupying over Southeast coast, having the highest barometric reading 763 mm. On the early morning of the 28th, centre of typhoon was lying near the island of Miyakojima, just entering the Eastern sea of China. The area of high barometer was almost stationary on the Southeast coast of Japan proper. A heavy thunderstorm broke out in the Ishigakijima, and torrential downpour of rain occurred. The amount of precipitation during one

hours from 10 am to 11 am on the 28th was 19.1 mm, that from 11 am. to the noon 14.8 mm, and that from the noon to 1 pm 22.0 mm. The force of wind during the heavy rainfall was comparatively small, being below 10 metres per second.

The typhoon entered the Eastern sea of China on the morning of the 28th. The lowest barometer of 748.7 mm occurred at the Ishigakijima station at 5 am.

The following is an extract of the meteorological observations taken at the Ishigakijima meteorological station during the visitation of the typhoon :—

Date	Hour	Barometer	Wind direction	Wind velocity.
28th	2a	749.7 mm.	NNE	5.8 m/s
„	5a	48.7	N	5.7
„	6a	48.8	N	6.1
„	7a	49.2	N	10.1
„	8a	49.4	NW	8.9
„	9a	50.0	NW	8.7

At the meteorological station in the island of Okinawajima, the following entra observations were taken during the passage of the storm :—

Date	hour	Barometer	Wind direction	Wind velocity.
28	8p	749.5 mm.	ESE	6.8 m/s
„	10p	48.7	SE	8.6
„	11p	48.1	SE	9.6
„	Midnight	47.3	SSE	9.4
29	1a	46.5	S	9.7
„	2a	46.3	S	11.2
„	3a	46.3	SSW	9.8
„	4a	46.6	SSW	8.6
„	5a	47.9	S	8.6
„	6a	48.7	SSW	8.7

Lightnings were observed at 2a and 6a on the 28th, and at 1a, 2a and 3a on the 29th at Nafa, Okinawajima. A thurderstorm was also experienced at the island of Ishigakijima during the passage of the typhoon.

After entering the Eastern sea of China, the typhoon-centre advanced further northwards, and crossed the peninsula of Shangtung on the evening of the 31st. We give below the meteorological observations made at Chefoo during the visitation of the typhoon, which we extracted from the Bulletin of the Zikawei Observatory, Vol. XXVIII :—

Date	Hour	Barometer	Wind direction	Wind force
July 31	4p	750.8	NE	6—7
,,	6p	48.0	NE	7—8
,,	7.30p	46.5	ENE	7—8
,,	9p	45.5	E	7—8
,,	10.30p	45.0	S	7
August 1a	0.30a	46.5	S	7
,,	1.30a	47.0	S	7
,,	3a	47.8	S	7
,,	4.30a	48.5	SSW	5—6

The time used in the above observations is probably the local time at Chefoo, which is almost the same with Shanghai time.

The centre of typhoon entered Southern Manchuria, touching Port Auther on the early morning of August 1st.

2. *The typhoon of August 7th—12th.*

This typhoon came from the sea south of the Liukius. At first, it moved towards WNW till it appeared southeast of the island of Ishigakijima on the morning of the 7th. Passing between the islands Ishigakijima and Okinawajima on the afternoon of the 8th, the typhoon landed near Foochow, southern China. After entering the continent, the cyclonic storm gradually changed its direction of motion, and took a northeasterly course in the lower Yangtse valley between Chinkiang and Shanghai. At last, the centre passed near Wladiostok on the night of the 12th, touching the promontory of Shangtung on the morning of the same day. The track of the typhoon can be traced as far as Shanghai from Southern Liukius, and a greater part of it lying over the continent could not trace, owing to the sparseness of meteorological observations on the Asiatic coasts.

During the passage of the storm, the lowest barometric reading 736.8 mm was observed at 7.30 pm. on the 8th at Ishigakijima. Gale continued for about 80 hours from 7 pm on the 8th to 6 am. of the 12th, and the greatest velocity 35.1 metres per second was observed at 10.3 ap. on the 10th. Happily, however, the rainfall was comparatively less, so that no serious damage was done by the storm. We give below an extract of the meteorological register of the Meteorological station :—

Date	Aour	Barometer	Wind direction	Wind velocity.
8	10a	741.1 mm	N	9.1 m/s
,,	noon	39.6	NN	9.4
,,	2p	38.1	N	7.2
,,	4p	37.2	NNW	7.7

Date	Hour	Barometer	Wind direction	Wind velocity.
„	5p	37.0	NW	7.8
„	6p	37.0	W	8.3
„	6.30p	37.2	WSW	9.5
„	7p	36.9	SW	8.7
„	7.30p	36.8	WSW	14.1
„	8p	36.8	WSW	17.9
„	8.30p	37.1	SW	17.6
„	9p	37.3	SW	23.8
„	10p	37.9	SW	30.2
„	10.30p	38.2	SW	35.1
„	11p	38.6	SW	33.2
„	mm	38 4	SW	30.6

We give also an extract of meteorological Observations made at Zikawei Observatory near Shanghai:—

Date	Hour	Barometer	Wind direction	Wind velocity.
10	9a	746.6 mm	E	3.4 km/n
	1p	45.9	ESE	2.2
	5p	45.5	SE	1.8
	9p	45.6	ESE	3.2
11	1a	44.7	SE	4.2
	5a	44.1	SSE	3.0
	9a	44.7	SSE	3.6
	1p	44.3	S	3.3
	5p	44.6	S	2.6

Here it should be noticed that the time employed at the Zikawei Observatory is the 120th meridian time, and the barometric pressure here given is not reduced to see-level and to standard gravity.

3. *The typhoon of September of the 7th—the 9th.*

This typhoon appeared near the Marianne groups on the 6th of the month, and moved at first towards the northnorthwest, arriving on the parallel of the Okinawa-jima on the night of the 7th. Gradually recurving towards the northeast, the typhoon appeared south of the cape of Murotosaki in southern Japan on the night of the 8th, and landed near Cape of Shiomisaki in the peninsula of Kii. It passed near the town of Hamamatsu at 3 am on the 9th, and north of Tokio on the early morning of the same day. After entering the Pacific, the typhoon rapidly travelled towards the northnortheast, and arrived Southern Kuriles on the night of the same day.

Our morning weather chart of the 7th gave the first indication of the approach of this severe typhoon. On the afternoon of the same day, the barometer fell in the Southwestern islands, and heavy gales set in over the Amami-Oshima and the neighbouring islands on the afternoon of the same day. The typhoon was then recurving towards the northeast, and its rate of motion was very small, so that it seemed the centre was almost stationary during the day. Next morning, the centre of typhoon passed east of the Amami-Oshima northeastwards, causing general rainfall over southern and southeastern Japan. On the night of the 8th it arrived southwest of the cape Shiomisaki. The rapid fall of barometer took place in southern Japan, the fall in the past 8 hours ending at 10 p.m. of the same day being 11.7 mm. at Shiomisaki station. The typhoon passed towards the northeast along the east coast of Kii peninsula, and passed north of Numazu and Hamamatsu on the early morning of the 9th. We give below an extract of the observations made at the two stations, Hamamatsu and Numazu during the passage of the typhoon :—

Numazu.					Hamamatsu.				
Date	Hour	Barometer	Wind.d.	Wind.velo.	Date	Hour	Barometer	Wind.d.	Wind.velo.
8	6p	756.9	E	1.9	8	6p	755.1	SE	3.4
	8p	56.3	ENE	2.7		8p	55.1	ESE	5.2
	10p	55.7	ENE	1.5		10p	53.8	ENE	6.2
	11p	55.4	NE	1.6	9	2a	41.1	ESE	18.2
9	2a	47.4	NE	5.2		2.30a	36.5	ESE	21.3
	3a	45.2	S	4.1		3a	21.8	SW	27.2
	4a	39.9	SW	14.3		3.30a	36.1	WSW	17.1
	5a	28.9	SW	5		4a	41.9	WSW	19.5
	5.30a	41.3	SW	19.0		5a	48.3	W	10.8
	6a	44.3	SW	19.0		6a	49.3	WSW	9.7
	7a	46.8	SSW	15.0					
	8a	48.5	SSW	12.9					
	9a	49.2	SW	10.5					
	10a	50.8	SW	7.2					

This typhoon attended an electrical display near its centre. Thunderstorms were felt at several stations lying near the track of the centre. At 6a.m. on the 9th, the typhoon centre was near Tokio, causing an enormous velocity of wind 47.5 m per second at that time. The barometer then sank to the lowest stand of 733.5 mm. The typhoon travelled rapidly towards the northeast, passing the north of Mito at 7.30 am on the 9th, and passed into the pacific. On the night of the same day, the typhoon passed east of Nemuro towards the southern Kuriles. At Nemuro, gales set in at 3p.m. on the 9th, and continued to the noon on the 10th, wind backing towards the northwest. At 8 p.m. on the 9th, the lowest barometer was observed, when sud-

den fall of wind velocity occurred, showing that Nemuro was then within a very short distance from the eye of storm. After a short time, the wind velocity suddenly increased, the greatest velocity 22.6 m. per second occurring at 11 p.m We give here the meteorological observations made at Nemuro observatory during the storm.

Date	Hour	Barometer	Direct. of wind	Velocity of wind.
9	1p	755.3	E	6.7
„	2p	51.9	NE	9.4
„	3p	49.8	E	10 8
„	4p	46 4	ENE	13.2
„	5p	43.1	ENE	15.8
„	6p	40.0	EN	15.7
„	7p	38.3	ENE	10.8
„	8p	37.9	NW	3 2
„	9p	39.8	NNW	19.0
„	10p	41.2	NNW	19.5
„	11p	43.3	NNW	22.6
„	m. n	44.9	W	16.0
„	1a	46.0	WNW	16.6
„	2a	47.1	WNW	15.8
„	3a	48.0	W	15.6

4. *The typhoon of November 3rd—the 6th.*

On the morning of the 3rd, a decided fall of the barometer took place in the Southwestern islands and on our Pacific coast, showing the approach of a barometric depression from the sea south of the Ishigakijima island. On the afternoon of the same day, a typhoon of great intensity appeared south of the island. The barometer continued falling very quickly all over the islands of Liukius, and severe gales with torrential rainfall set in. At the Ishigakijima meteorological station, the barometer indicated 754 mm at 6a m. on the 3rd, and as the centre of typhoon drew near the island, the barometer began to fall with rapidity, and the lowest reading 722 mm was observed at 10,30 p.m. on the same day. The average rate of the fall of barometer for the 17.5 hours was 1.8 mm per hour, and the greatest rate was 5.6 mm per hour. The intensity of wind also steadily increased from the morning of the 3rd, and an enormous velocity of 70.7 metres per second was observed at 5,30 p.m. on the same day, when the cups of the Robinson's amemometer of the Observatory were blown away. We give below an extract of the meteorological register at the Ishigakijima meteorological station during the passage of this storm :—

Date	Hour	Barometer	Direct. of wind	Velocity of wind.
3	1p	748.8 mm	NE	29.3 m/s
"	2p	45.8	NE	31.0
"	3p	44.1	NE	33.4
"	4p	42.6	NE	35.4
"	5p	38.5	NE	42.8
"	5.30p	36.0	NE	70.7
"	6p	33.2	NE	(6)
"	7p	27.6	NE	(6)
"	8p	25.4	NE	(6)
"	9p	23.1	NE	(6)
3	9.30p	22.8	NE	(6)
"	10p	22.6	NNE	(6)
"	10.30p	22.2	N	(6)
"	11p	23.7	N	(6)
"	11.30p	24.0	NNW	(6)
"	m. n.	24.2	NW	(6)
4	1a	29.0	NW	(6)
"	2a	34.0	WNW	(6)
"	3a	38.5	WNW	(6)
"	4a	40.0	W	(6)
"	5a	43.2	W	(6)

The centre of typhoon passed east of the island of Ishigakijima on the night of the 3rd, gradually recurving towards the northeast, and approached the island of Okinawajima The meteorological observatory at Nafa in the island reported: " Since the evening on the 4th, the wind increased in force, the direction being constantly SE, and the barometer began to fall very quickly. Since the midnight, the wind became furious, and rain began to fall in torrents. The lowest barometer 725.7 mm was observed at 2,35 a.m. The direction of wind suddenly changed to the west at 3 a.m. There was an interval of relative calm before that hour. As the wind veered towards the northwest, the barometer began to rise with a great rapidity. The greatest-velocity of wind 38.1 m per second was observed at 5. a.m. The tiles of several houses were blown away; branches of trees broken down, and some of large trees rooted. Two houses were completely destroyed, and many buildings including the signal mast and the thercmometer screen were greatly damaged." We give below the meteorological observations taken at the Naha observatory during the passage of the severe typhoon :—

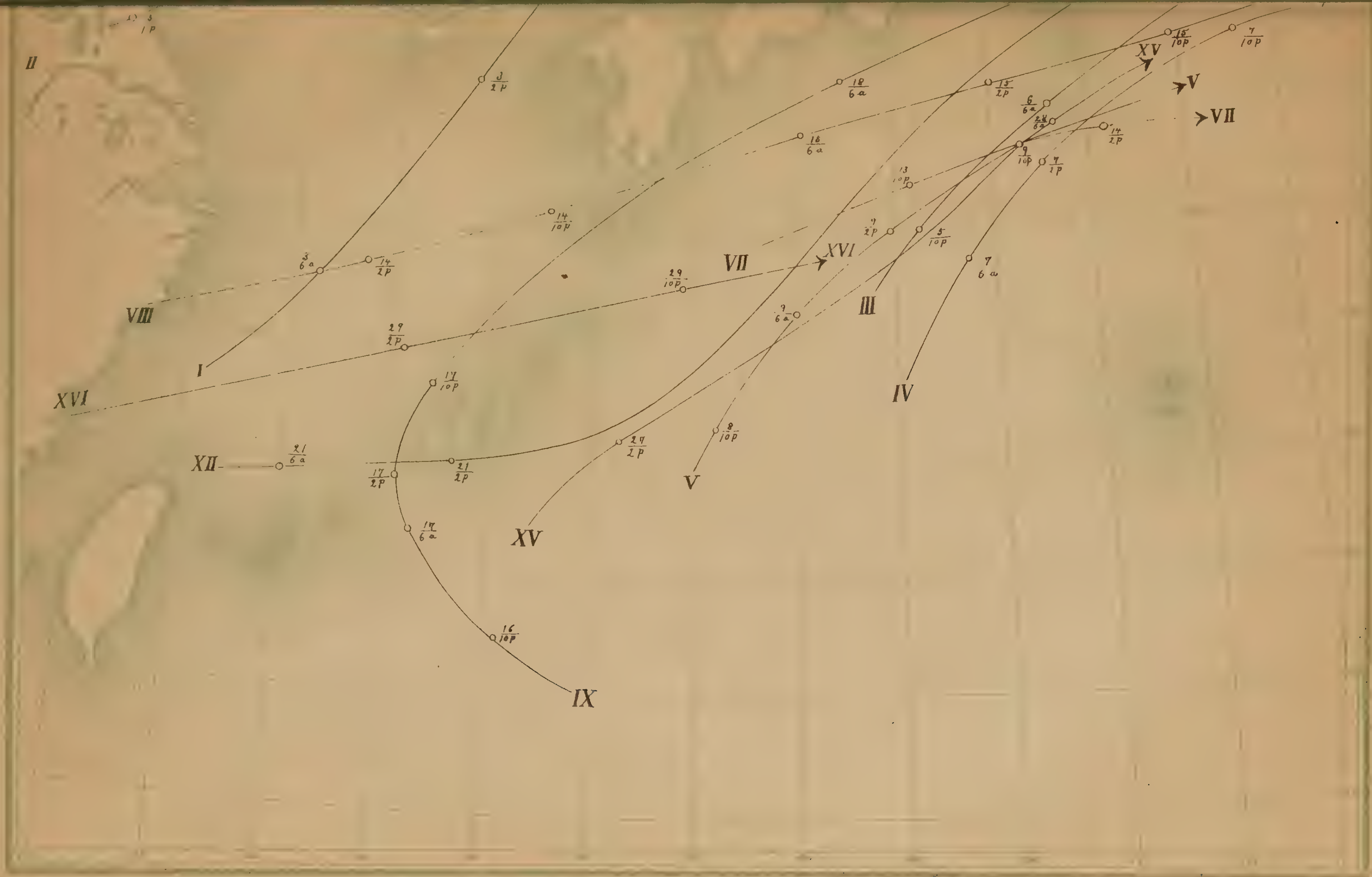
Date	hour	Barometer	Direct. of wind.	Velocity of wind.
4th	4p	755.8 mm	E	5.3 m/s.
„	6p	55.2	SE	7.9
„	8p	53.9	SE	10.1
„	10p	51.5	SE	11.6
„	11p	49.4	SE	12.2
„	m.n.	46.1	SE	14.8
5th	1a	39.3	SE	18.4
„	2a	30.7	S	21.7
„	3a	27.6	WSW	18.1
„	4a	32.5	NW	19.1
„	5a	37.6	NW	38.1
„	6a	45.3	NNW	32.8
„	7a	49.7	NW	30.0
„	8a	52.4	NNW	25.7
„	9a	53.4	NNW	18.6
„	10a	54.5	NNW	16.9
„	11a	55.5	NNW	15.4

The typhoon passed north of Naha on the night of the 4th, and south of the Amami-Oshima on the afternoon of the 5th. Since it left the neighbourhood of the Ishigakijima, its centre became rapidly shallow, and the force of wind was considerably decreased. The minimum barometer observed at the Oshima meteorological station was 753.1 mm at 3 p.m. on the 5th, and the maximan wind velocity 10.9 metres per second at 6p.m. on the same day, the direction being the north. A comparison of the following extract from the meteorological register at the Oshima station with those at Naha and Ishigakijima given above will show that the typhoon was gradully filling up in its way towards the Pacific :—

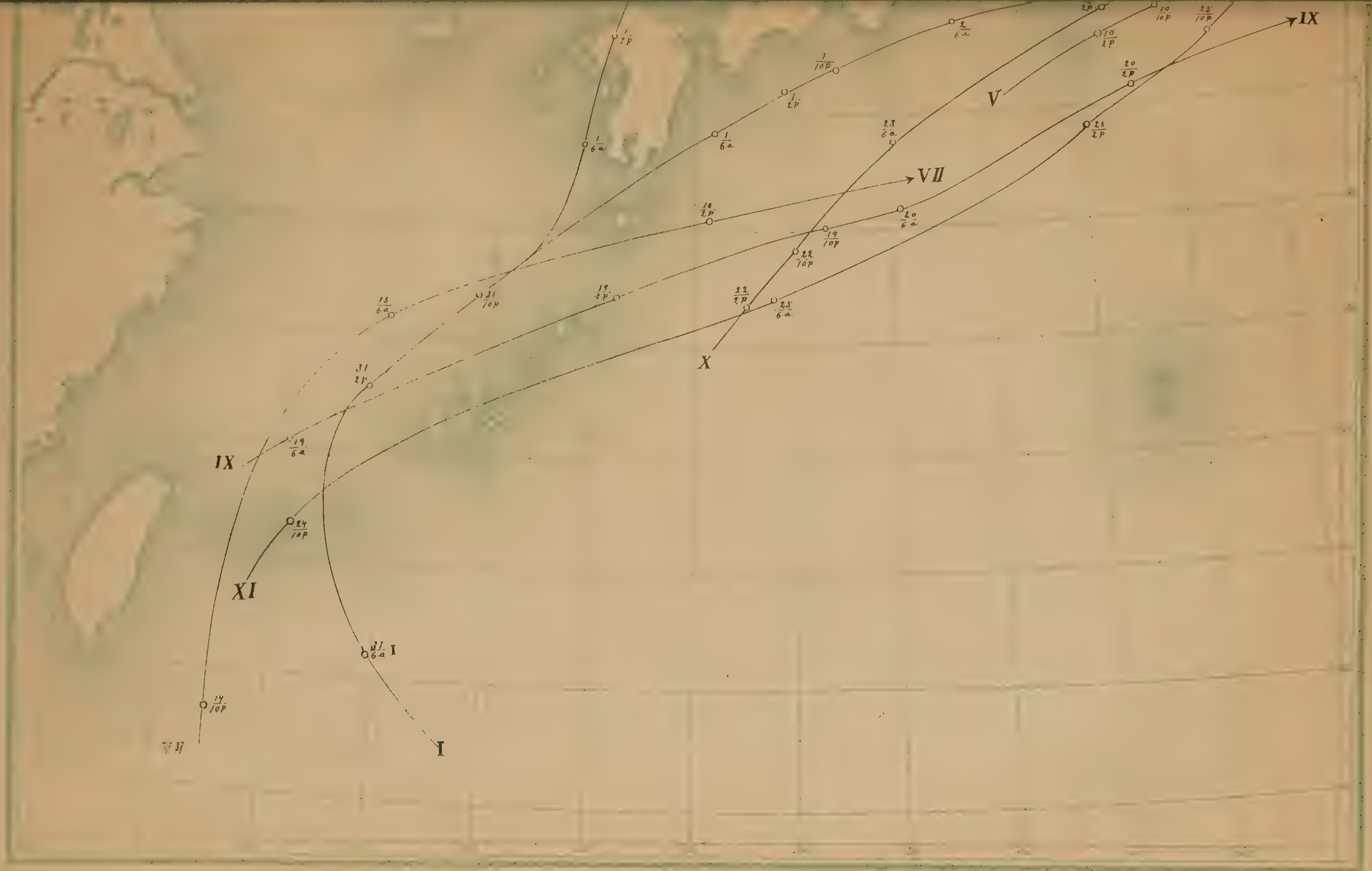
Date	Hour	Barometer	Direct of wind	Velocity of wind.
5th	10a	755.8 mm	SE	4.8 mm
„	11a	55.2	SE	5.4
„	noon	54.1	SE	5.1
„	1p	53.9	SE	3.3
„	2p	53.4	SE	3.7
„	3p	53.1	NE	3.4
„	4p	54.1	N	7.8
„	5p	54.4	N	9.4
„	6p	55.0	N	10.9
„	7p	55.4	N	8.4

The typhoon further advanced towards the northeast, and passed far south of the island of Hachijo, which lies off our southeast coast on the night of the 7th.


TRACKS
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January, 1897.
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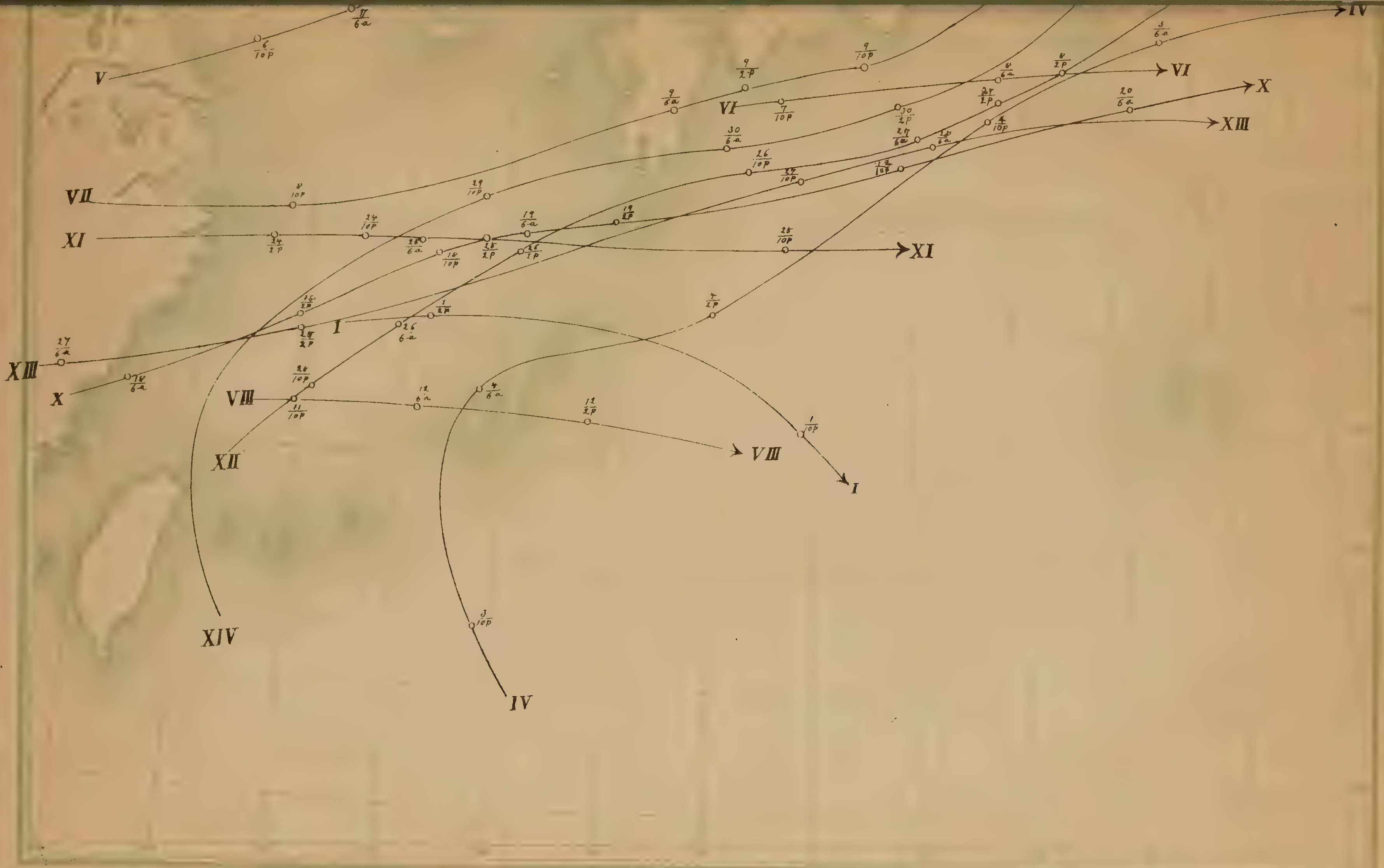

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TRACKS
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BAROMETRIC DEPRESSIONS.
February, 1897.
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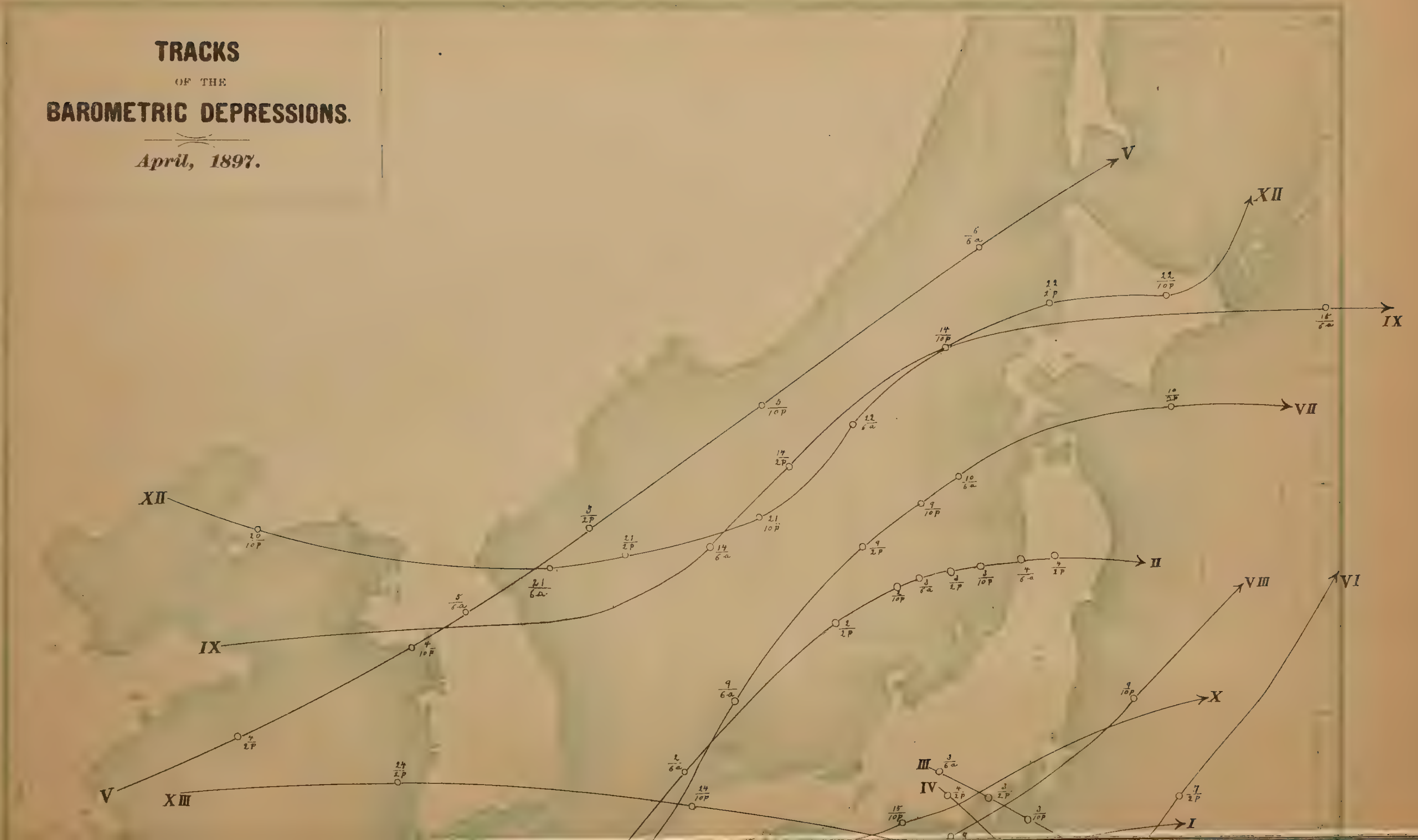

TRACKS
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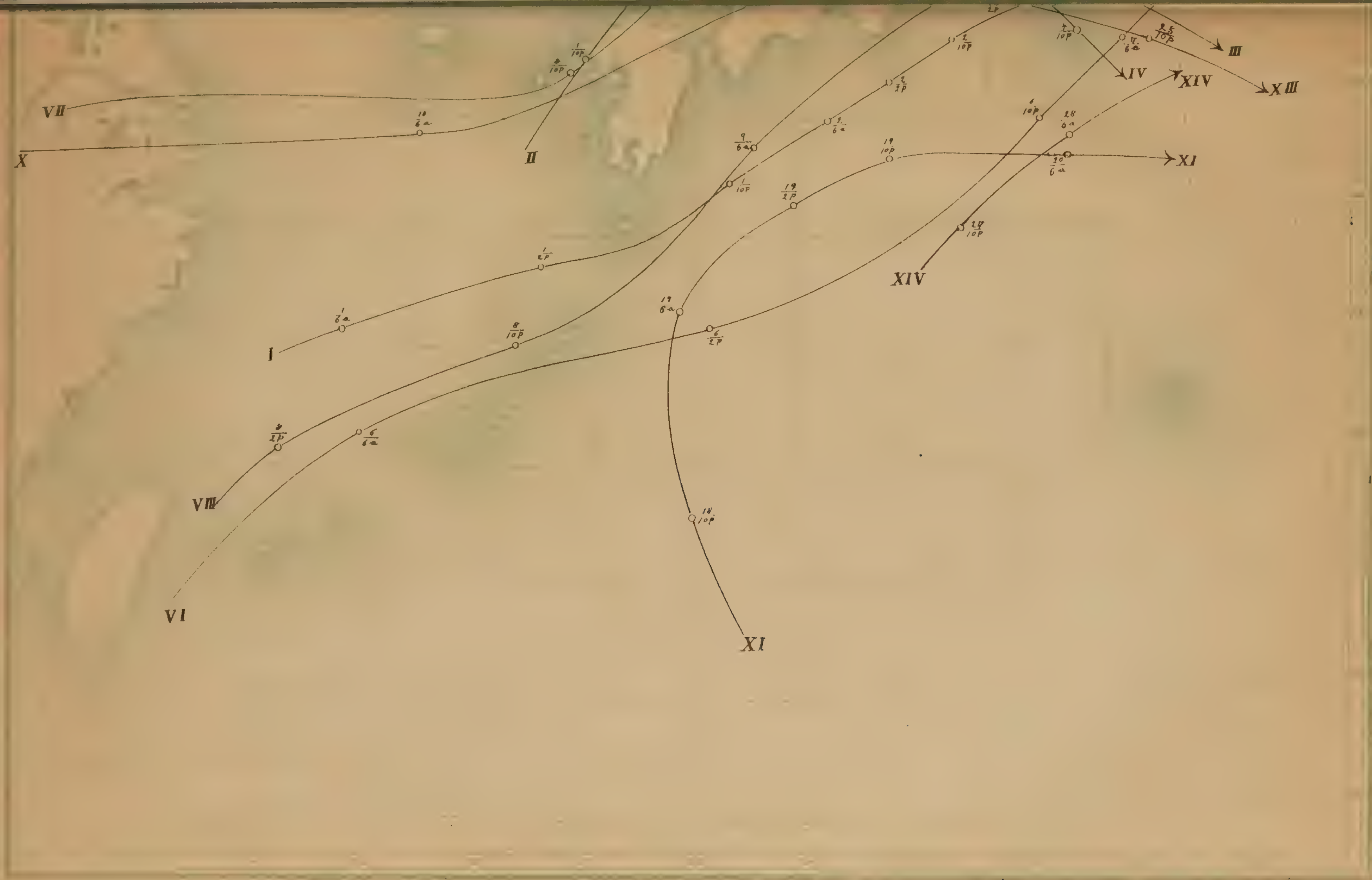

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PL. IV.

TRACKS
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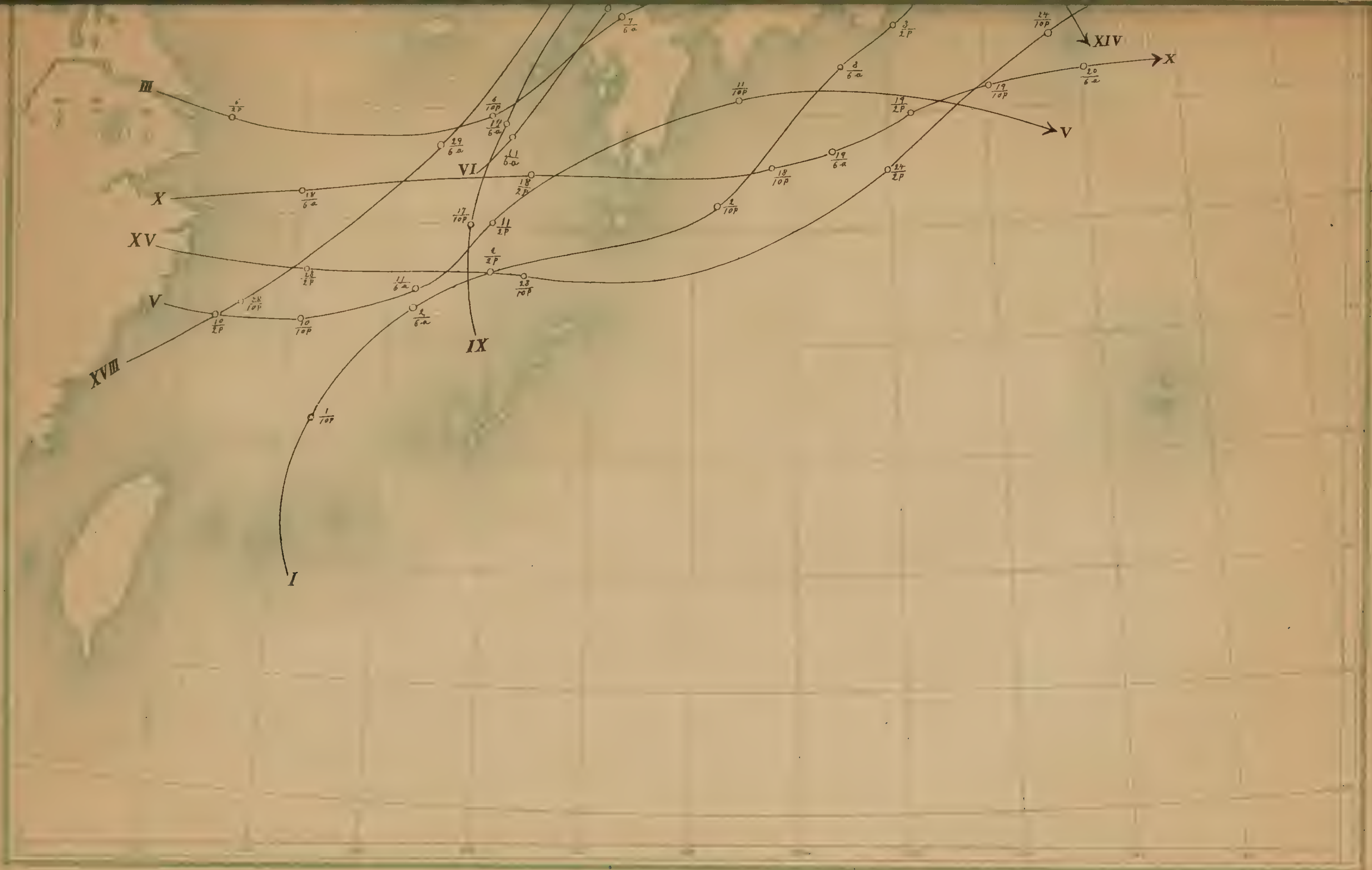



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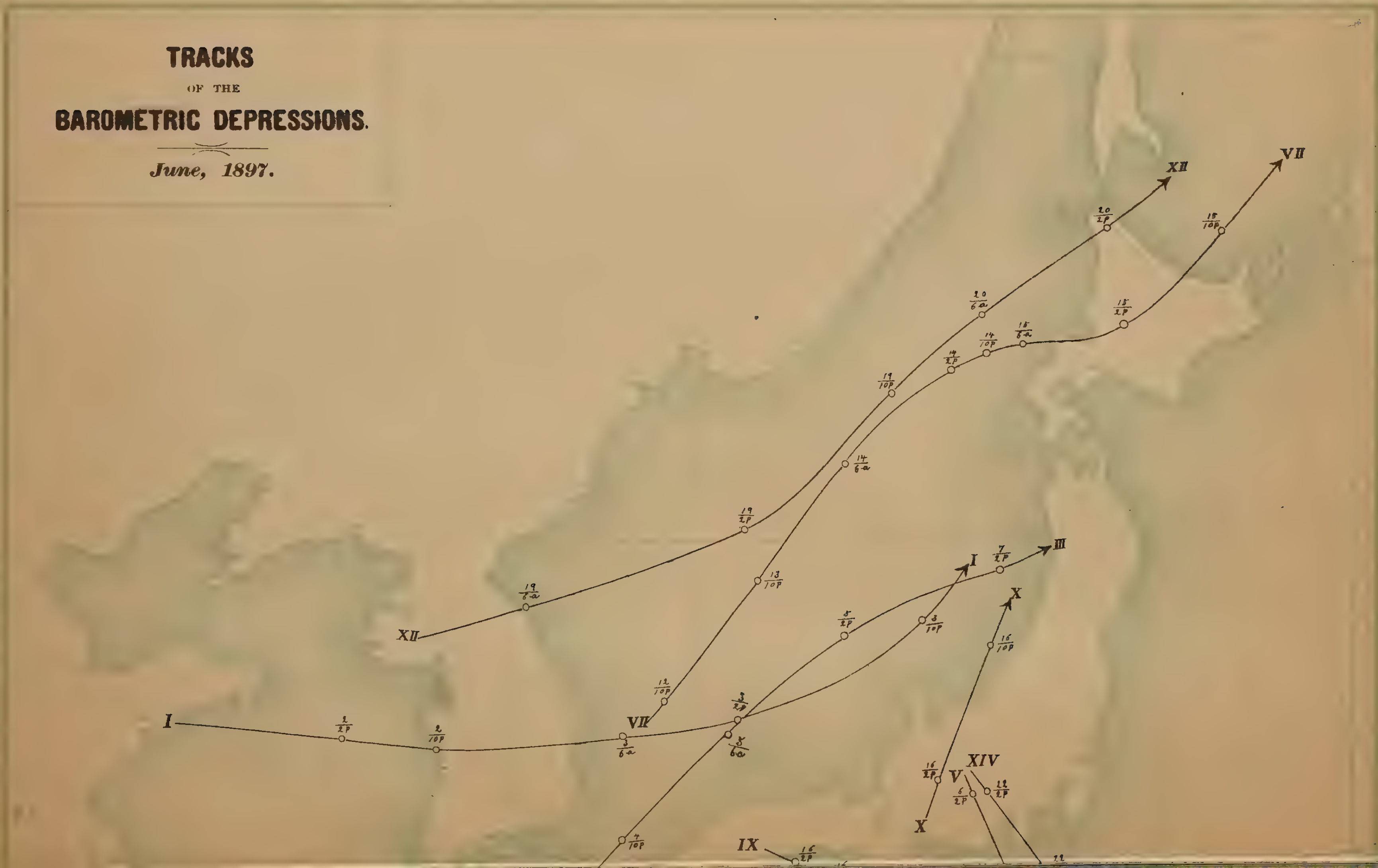
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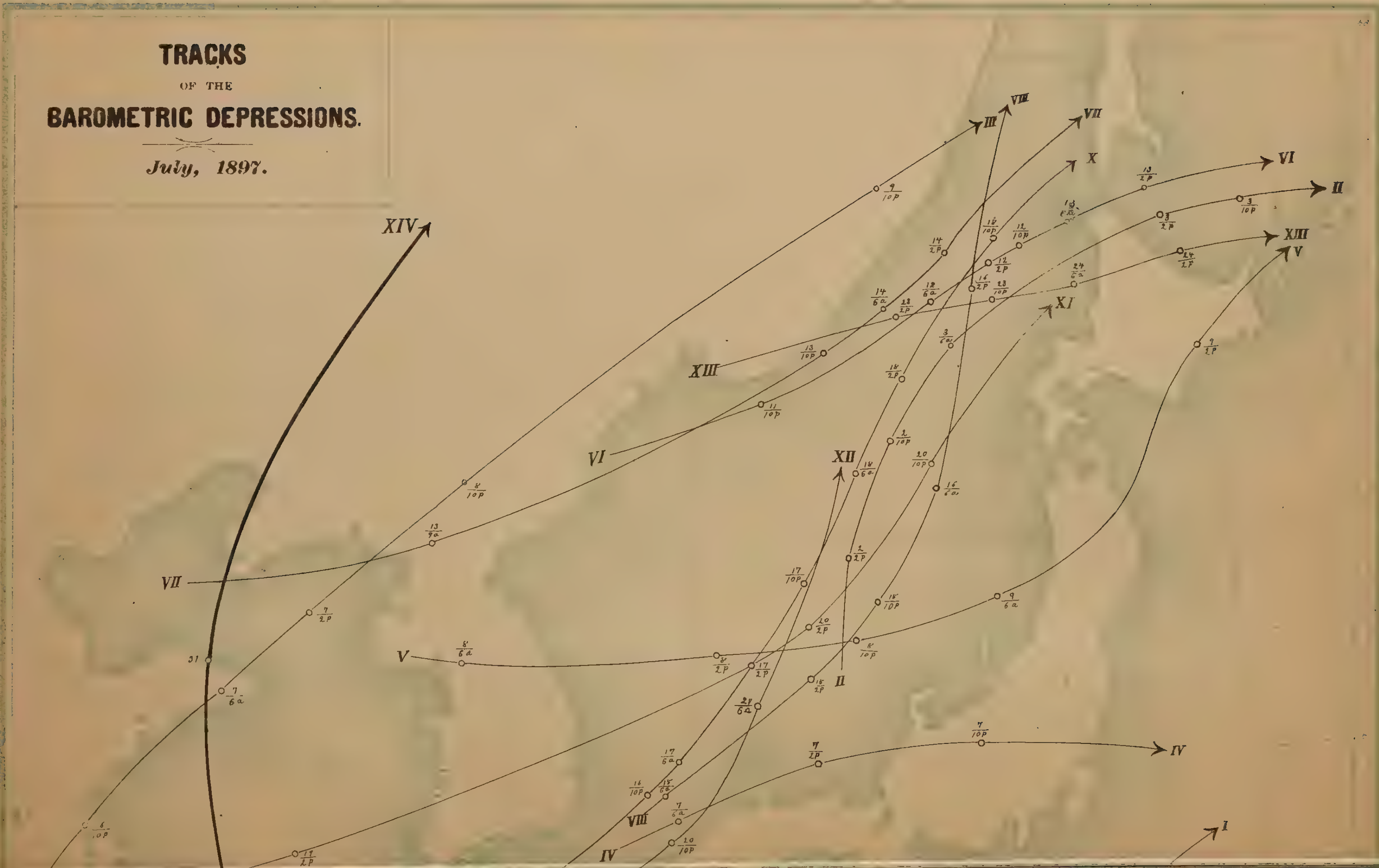

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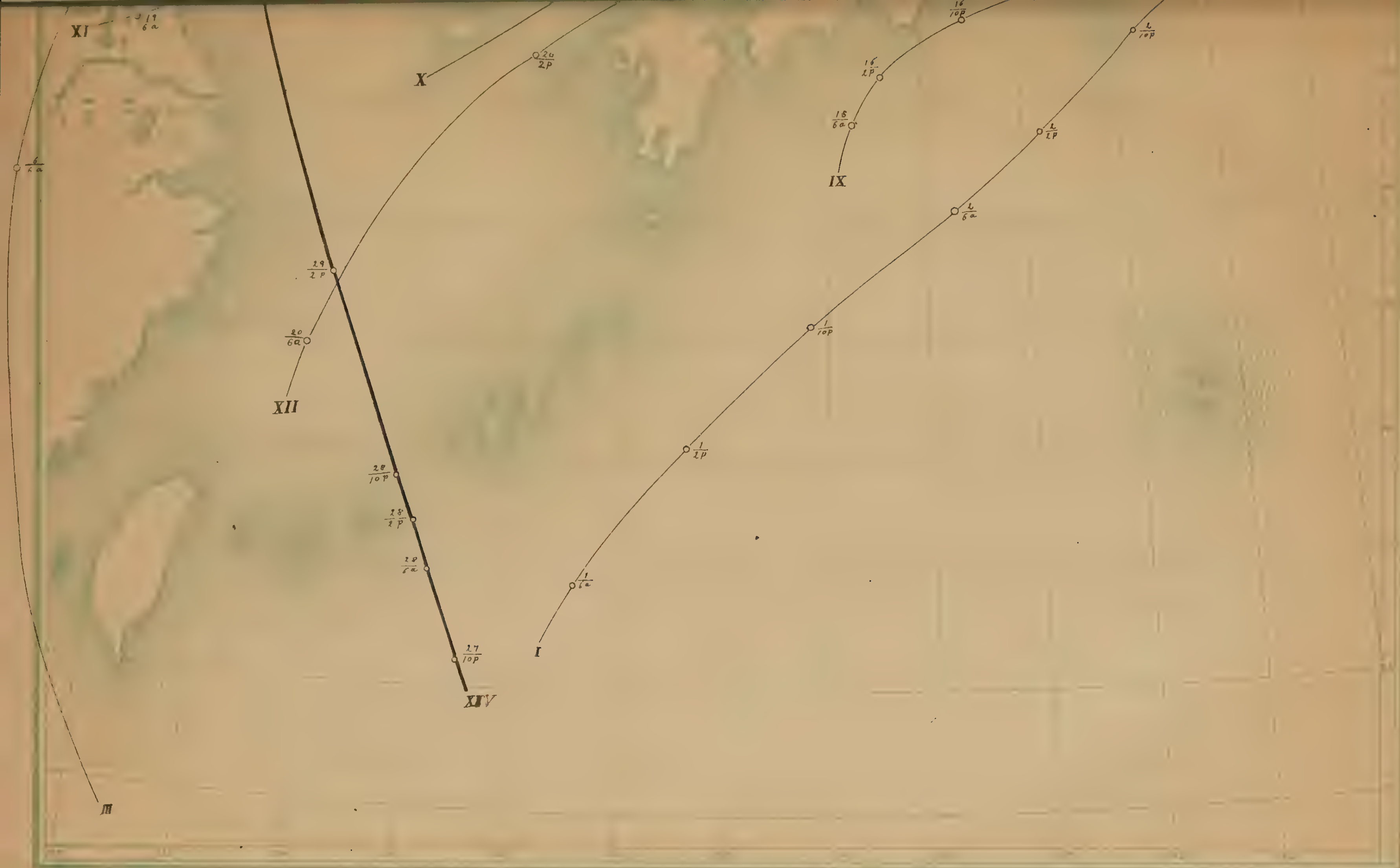
TRACKS
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June, 1897.



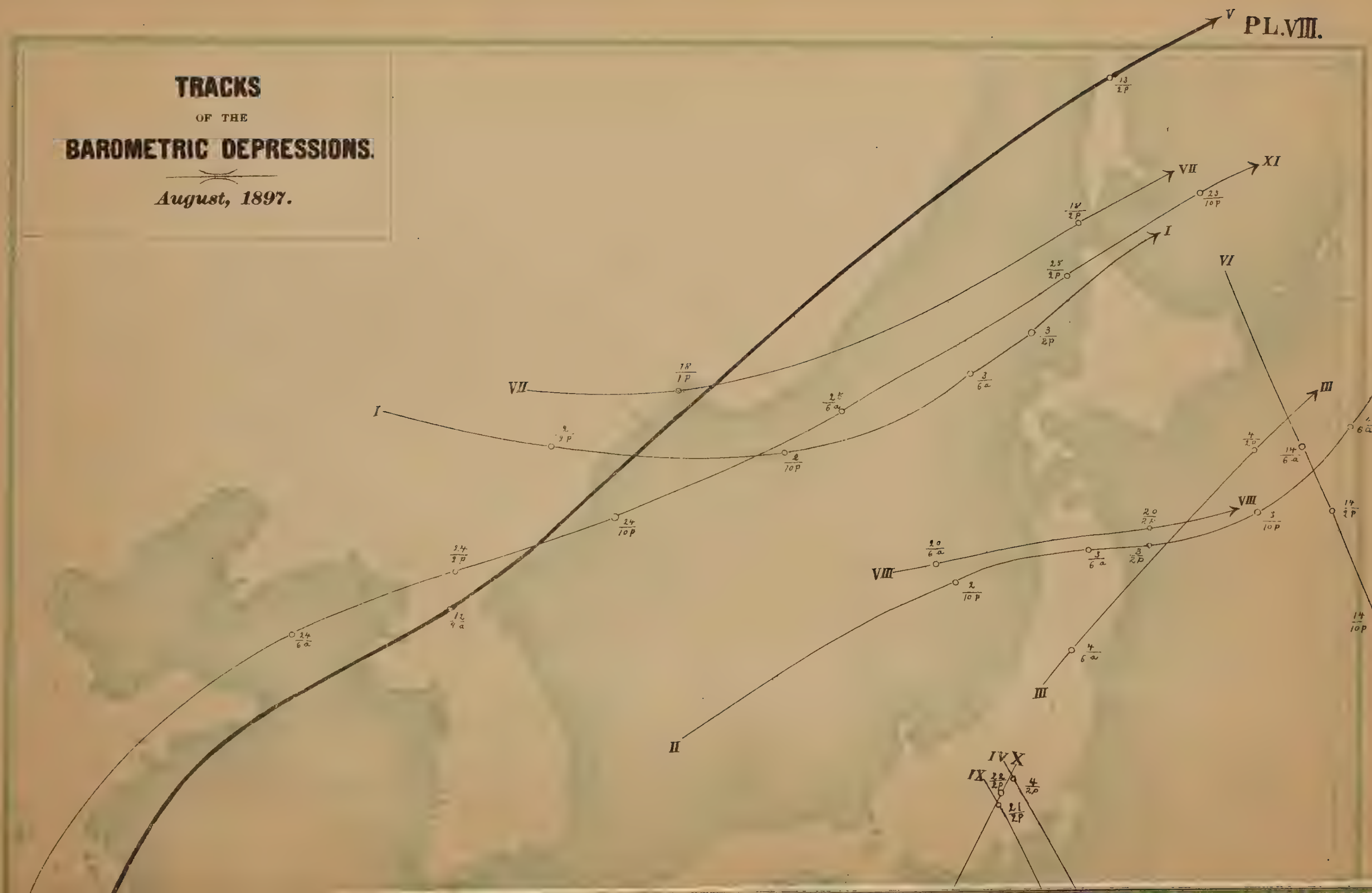


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TRACKS
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PL.VIII.



TRACKS

OF THE

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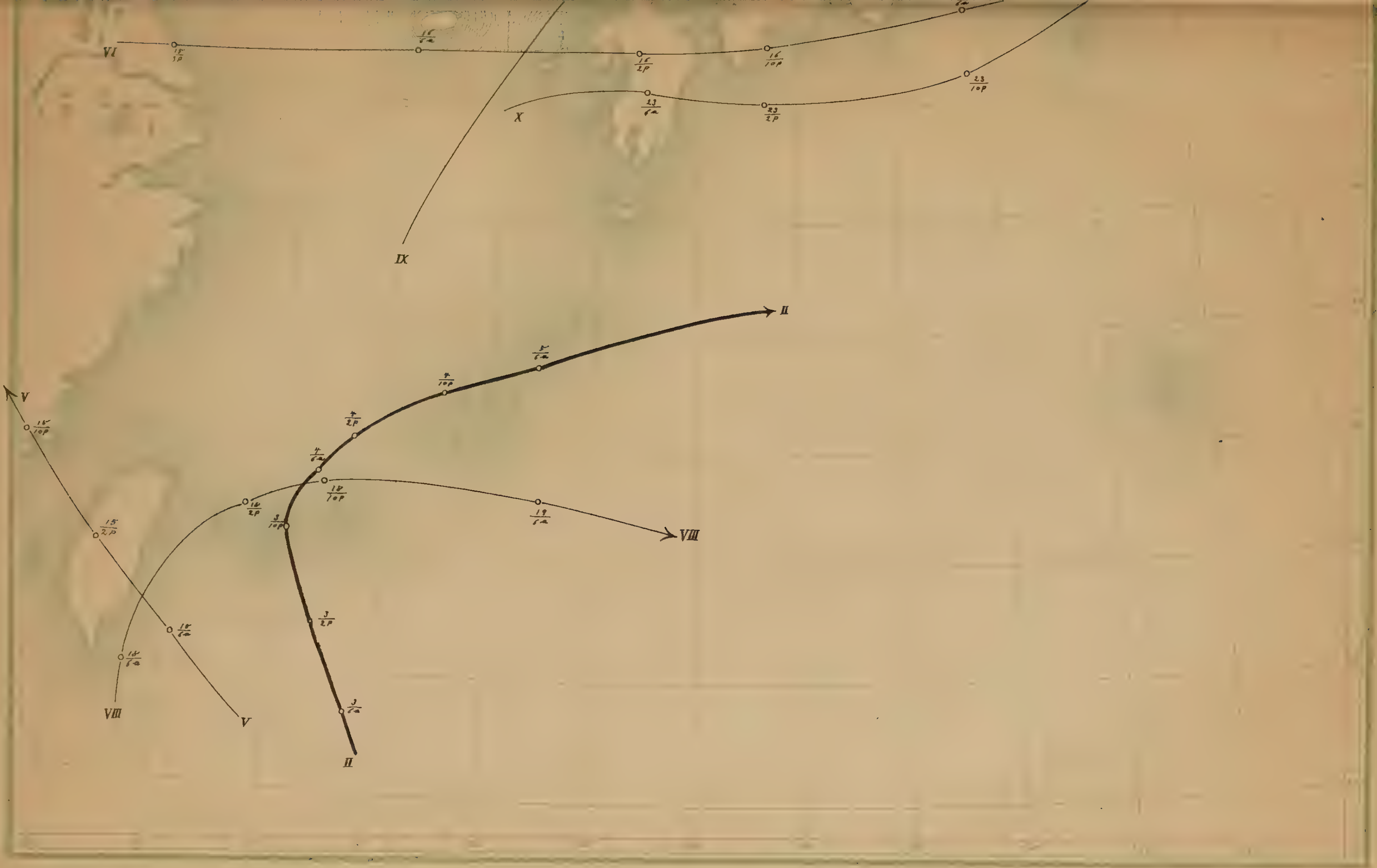

TRACKS
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BAROMETRIC DEPRESSIONS.
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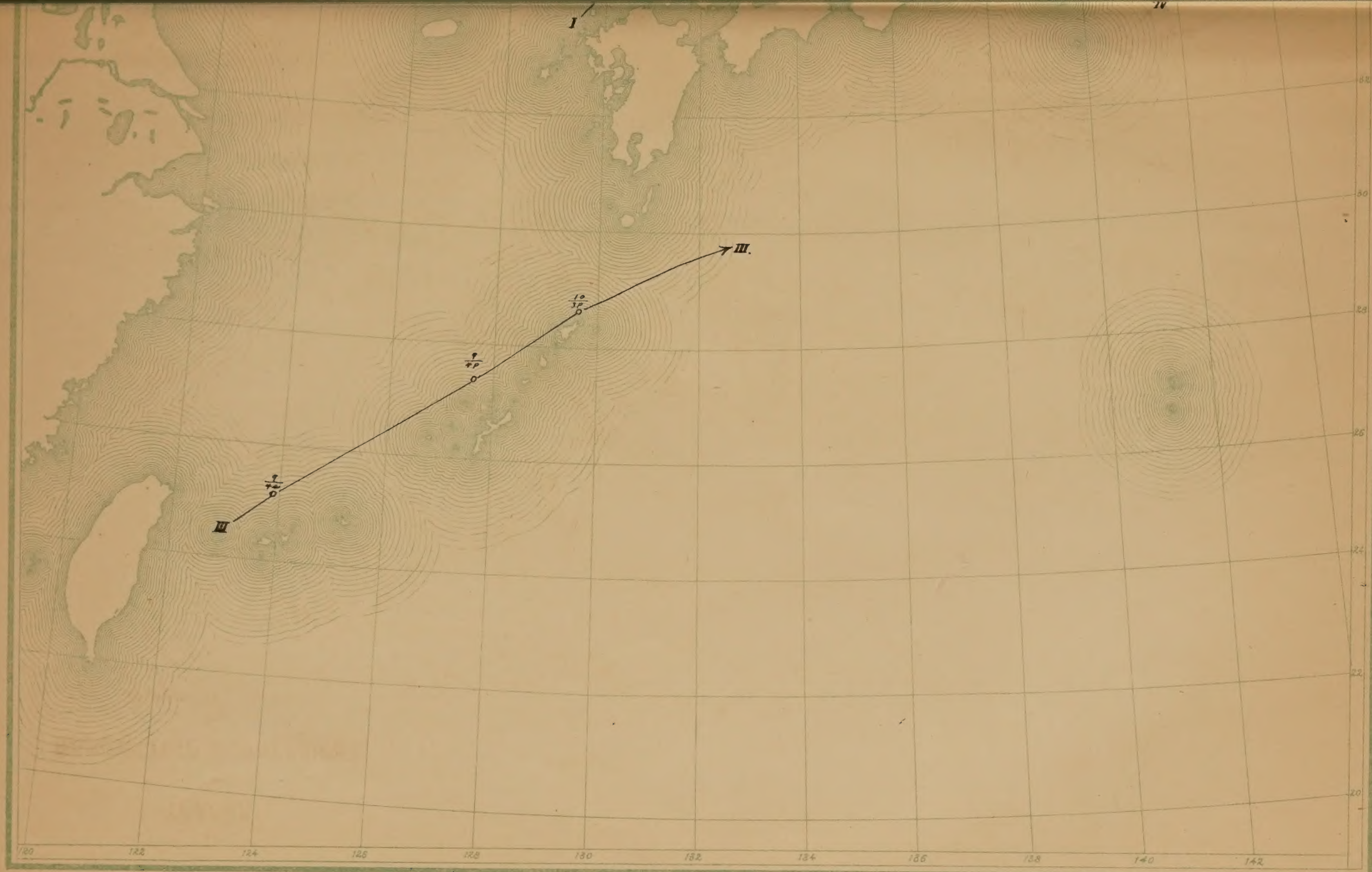


TRACKS
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